COAL AGE

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Encouraging the Boss

EVERYBODY seemingly takes pleasure in advising managers, superintendents and foremen to give the men under them a pat on the back. The common cry is "Fair play for the under-man"—the fellow who slaves ceaselessly using his hands more than his head.

This is all very well; it sounds fine and is just as fine as it sounds. However, there is another side to the story. Justice looks up, down and sideways. After we have given thought to the employee, let us turn attention to the boss.

Sometimes the mine official, the so-called "big fellow," becomes enveloped in a blue atmosphere and is near sinking in his little sea of petty tribulations. It is then he also needs encouragement in the form of evidence that his efforts to tote squarely for the company and the men are appreciated.

The best way to encourage a good boss is to carefully carry out all instructions; to get the spirit of what he is trying to do, and then embody that spirit in the everyday work. A recent experience may show how true this is.

The manager of a certain company noted for its fairness and uptodate methods was returning from a visit of inspection to one of his plants. I met him on the train and asked where he had been. He smiled broadly and replied that he was coming from No. 4 mine. I told him he seemed to have had a good day.

He said: "Yes, I have; I've worked hard all day. My superintendent at No. 4 is a man I feel proud of. First, because he now acknowledges, contrary to his former views, that we are better off for treating our men so decently and spending so much money for their wellbeing. But better still, I am happy to find that this superintendent, who used to be a little contrary about carrying out our instructions, has for some months been trying his best to do all we tell him or write to him.

For 1916
We Follow Instructions

"In fact, he is the fellow who has showed me that it is possible for a manager to write too many letters of instructions. Today with great pride he called my attention to the motto of his organization for this year. It reads like this: 'For 1916 We Follow Instructions.' Now," the manager said, "it's up to me to give clear orders and not too many. I know the boys at No. 4 will carry them out."

That manager was thoroughly content with his visit to the No. 4 mine. How many more bosses of mines all over the country would be encouraged this year if the men along the line would give them this kind of loyal support.

MEN, *encourage your boss. You can do it by faithful work, by obeying orders and by being loyal with your tongue as well as with your hands. Let the boss know you are for him all the time. At the end of the year you will have a bigger boss and be a bigger man yourself.*

Accidents from Carelessness

[This is the second installment of articles showing the dire results of carelessness in mining. If all of the men who work underground in coal mines would exercise ordinary caution, obey orders and carefully observe company rules and state laws, the death rate in mining would be reduced to a surprisingly low total. We will print two or three further installments of these articles in the hope that they will carry a warning to the men at the face, and in addition cause mine officials to recognize more fully the absolute necessity of requiring strict obedience on the part of all employees. Some companies are now resorting to instant dismissal as a punishment for breaking any rules, and it is a question whether such severe measures should not prevail at all mines. The authors of some of these articles have requested for obvious reasons that their identity shall not be revealed. We are pleased to comply with this wish. It must be understood, however, that all articles come to us signed, so that we have our contributors' guarantee of good faith.—Editor.]

Roof Kills Two Men

Here is a real happening where carelessness caused death to a miner and laborer in an anthracite mine some time ago.

This man worked a chamber off the same gangway as I did and had the record of being the best miner in that section. The coal we were working was about 7 ft. high on the average, but the roof was very bad, and it took about all the miner's time to keep his place timbered.

One day the mine foreman on a round of inspection came into my chamber and said: "What is the matter with you? Can't you turn out the same amount of work as that miner?" He meant the miner referred to, who had a record.

In answering I told him the condition of the roof and the time it took to timber it and make it safe, and further I reminded him that I would see myself and my laborer safe if I never sent a car of coal out. In concluding I said I might be sending coal out when the man he referred to was dead and gone. I don't know what caused me to make this remark, and it often comes to my mind.

Monday morning, on making my report to the fireboss, I heard the latter make this remark to the good miner, "Why don't you keep your chamber timbered like this man?"—referring to me. "Your place is not fit for anyone to work in, and you have had more falls in your chamber than all the other chambers put together." In concluding, he said, "You will not move from this shanty until the foreman comes."

Then I went to my work and later the driver told me that the foreman and fireboss went in that chamber to direct the miner where to stand his props and where they were most necessary.

After he had timbered the roof as he was directed, he started to blast coal, and on firing two holes he ordered his laborer to push a car up to the face and load it. He stated that he would restand the props later, as he did not wish to miss any cars.

Before the miner could restand his props and before the laborer had half loaded his car, the roof crashed down and killed both men instantly. I heard the noise and helped to dig them out from under the fall; it was a horrible scene.

That was the result of breaking Rule 34, Article 12, of the Anthracite Mine Laws.

Sulphur Ball Crushes Two Men

After reading *Coal Age* today I was reminded of an experience similar to the story about putting up two sets of timber under a bad roof.

Twenty-one years ago I was appointed assistant to the inside foreman in one of the D., L. & W. coal mines. This foreman was a great churchman, and to procure a position as a miner under him it was only necessary to be a member of his church.

The first week that I was there I found this out, and I also discovered that he had some mighty incompetent miners, but they were good churchgoers.

About a year after I had first located at this mine, we were starting places in a 9-ft. vein which had some bad sulphur balls in the roof. These chambers were extremely dangerous, and it was necessary to drill into the roof and shoot down the sulphur balls.

Well, one of the foreman's churchmen had a place in this vein, and after driving in about 100 ft. off the gangway, he encountered a sulphur ball that was cigar-shaped and extended almost the width of the breast.

The first day I ordered him to take it down, and he said he would.

Two days later I was again going my rounds in his place, and I saw he had not taken the dangerous rock down, so I told him in a few unreligious words what would happen to him if it was not down when I came in the next day. I even went further and made him start to drill the hole to take it down. After I had him started on the drilling, I left the place, and the next morning about 10 o'clock I got word that he and his laborer had been crushed to death by the fall of the sulphur ball.

He had waited till I had left the place and then removed his machine from the roof so as to drill the coal in the face. Result—two men dead.

The Last Post

By Thomas Mordy*

At Lumley 6th Pit, Durham, on ——, 1909, Alfred Brown, aged 54, killed whilst "drawing." Deeply mourned by his sorrowing family and a wide circle of friends.

This obituary notice—and a memory—were all that was left of one of the most careful, experienced and practical miners I have ever known, and—it was unnecessary. Nay, more; it was willful disregard of a known and imminent danger.

Alf was fireboss at Lumley 6th Pit, County Durham, England, at the time I was master shifter and backoverman there, and impressed me as a wide-awake, practical man, alive to all dangers and equal to all emergencies—a man you could turn to when someone was wanted to handle a ticklish job without any worrying on your part as to whether he'd come through all right. And yet he—well, you can judge for yourself.

*Cumberland, B. C., Canada.

As often happened, Alf and his partner, after seeing all the backshift-men out of their district, had to go back and draw a jud, or a "skip" that was finished. Alf was a hard worker on these jobs and knew the value of quick action before the place began to work, and with his keen ear and practiced eye watching how the jud carried, the work rapidly progressed, till only three props remained to be "drawn," when his partner cried, "Look out, Alf; there's a bad breaker right behind ye."

"Where, lad?" said Alf as he stopped to examine his outgate.

"Why, here," said his partner; and sure enough there was a big breaker going right across behind him. "We'd best stop and set another prop or two to make thee safe, lad."

"Never bother, lad," said Alf, "I'll hae these last three out afore thou has time to set one"; and with that he turned back and started on the first of the last three posts. It was the last he ever drew, for as he knocked it out his outgate caved in and buried him.

Truly a heavy price to pay for "taking a chance" on "the last post."

He left a widow and five children.

Returned Too Soon to Shot

I recall an accident that occurred some time ago which might have caused the death of two men. It happened in a mine where the miners fired their own shots. The two young men referred to had tamped their shots, and in splitting the end of the fuse on one of the shots it was badly mutilated. The time came to shoot, and each of the boys had a shot to light. In trying to light the shot with the mutilated fuse the best that could be done was to burn the tape. The boys stayed near it as long as it was advisable, then having lighted one of the shots, they ran out of the room and waited.

After a little while shot No. 1 went off. Then taking out their watches, they timed shot No. 2, and as it didn't fire, they started back to relight it; but sad to relate, they had not gone far before the shot exploded and one of the young men received a very bad cut over the eye, which required several stitches to close up.

I wish to add in this connection how my father, who has had a good deal of experience with shooting shots, both in this country and in Wales, went about preparing a shot where fuse was used instead of a battery. He gave the fuse a rigid examination before placing it in the powder. Sometimes a person can find an empty space in the fuse, and when such is the case, it is advisable to cut the fuse below the imperfection and throw the end away. It is better to lose a couple of feet of fuse rather than risk losing a shot.

Why the Light Went Out

By T. A. Evans*

Keep that lamp away from your powder. It takes but a second to remove it from your head. Why take a chance to save that second?

Let me relate an incident that happened at a mine where I worked. The characters were personal friends and near neighbors.

*Plymouth, Penn.

The miner had every reason to be proud of his buddy, or laborer, for he was his only son, who had been willing to help his father for awhile, so as to be able to go to college the following year. At first his invalid mother objected to his working in the mines, but the old miner had quieted her fears by exclaiming, "Why, Jane dear, he'll be working with me, and I have never had an accident in my 30 years of mining."

The day of the accident, the father drilled a long 7-ft. hole, and then with his son went back to the box to get the powder to shoot the hole.

Instead of putting the lamp a safe distance from the powder he left it on his head. His powder came already made up into cartridges, and as he selected a proper charge, a spark from his lamp fell into the end of the paper, setting off the powder. He dropped the powder, but it writhed and squirmed straight at his boy's face and burned him from head to foot.

After two months in the hospital the doctors said, "Too bad; he is blind for life!"

The shock killed the invalid mother. Three months afterward the father could stand it no longer and was found dead by the mother's grave, with a bullet through his brain.

The boy! Oh, he is a recluse now, for he cannot bear to have people see his hideous face and neck. He never goes out.

Hoisting Engineer Leaves Post

At the mine which is the scene of the following story, the slope hoisting engineer is required to look after two large air compressors, which are in the engine room, in addition to his duties as hoisting engineer. The slope is approximately 600 ft. long and is used exclusively for hoisting and lowering men. A covered cage is used and of such a type that it is impossible for more than one man to get in or out at the same time. The distance from the mouth of the slope to the engine house is about 100 ft.

While the engineer was engaged in hoisting a cageload of men, something went wrong with one of the air compressors, requiring his immediate attention. Instead of stopping the cage and then looking after his other work, he left the engine while it was running and went to the compressor.

He probably thought it would take but a moment to fix the compressor, and as the hoisting engine was running slowly, he would have plenty of time to spare. Perhaps he had done the same thing before. However, the air compressor required more attention than he anticipated.

The shouts of the men as the cage was dragged through the space between the mouth of the slope and the engine house called his attention to the throttle. Before the engine was stopped, however, the cage crashed through the side of the building and over the hoisting drum, resulting in the death of one man, the father of a large family, but several other men were injured.

The foregoing is only another instance of how innocent people must suffer because of the carelessness and utter disregard of law on the part of others. Needless to say, a hoisting engineer with men on the cage should never under any circumstances leave the engine while it is running.

A Record Replacement

By R. G. Miller*

SYNOPSIS—A plant that was destroyed by fire was rebuilt along new and more modern lines in less than two months. Steel and tile construction were employed. The tipple capacity was 250 tons per hour. Self-dumping cages and all modern equipment were installed.

The top works of the Central mine of the Woodside Coal Co., Eighth and Hickory St., Springfield, Ill., were destroyed Nov. 18, 1915. The fire originated between the boiler and engine rooms and spread rapidly beyond control, which resulted in the loss of nearly the entire plant, amounting to approximately $50,000.

It was the coal company's desire to rebuild as quickly as possible in order to participate in a portion of the winter business, but at the same time it wished to use only the most modern type of fireproof construction, suitable to its wants and conditions.

After several days' consideration of a number of designs and estimates, it adopted a Marcus steel tipple and tile construction for the power plant. A cash bonus was offered for the early completion of the work.

*Mechanical engineer, Chicago, Ill.

On Nov. 26, 1915, the contract was let to the Roberts & Schaefer Co., of Chicago, with Feb. 5, 1916, stipulated as the latest date of completion ready to furnish screened coal at the rate of 250 tons per hour.

The situation demanded exceedingly quick work in finishing the concrete foundations so that the structural steel work could proceed without interruption. Construction work in the field started Dec. 7, just nine working days after the letting of the contract, and on Dec. 20 the erection of the steel tipple was commenced, being finished Jan. 8, complete in every detail.

All of the screening machinery, chutes, etc., were on the ground at this time, so that assembling and erecting them followed without delay. While the new steel tipple was nearing completion, similar progress was made on the power house, and the repairing of the damaged equipment there was finished. Even before the roof was on, this work proceeded under canvas canopies, so that no delay whatever was permitted.

On Jan. 27, ten days ahead of the stipulated time of completion, the plant was put into operation—a remarkable record, and a service for which the operators were glad to pay the bonus. This enabled them to make the mine active and permitted 400 men to return to work.

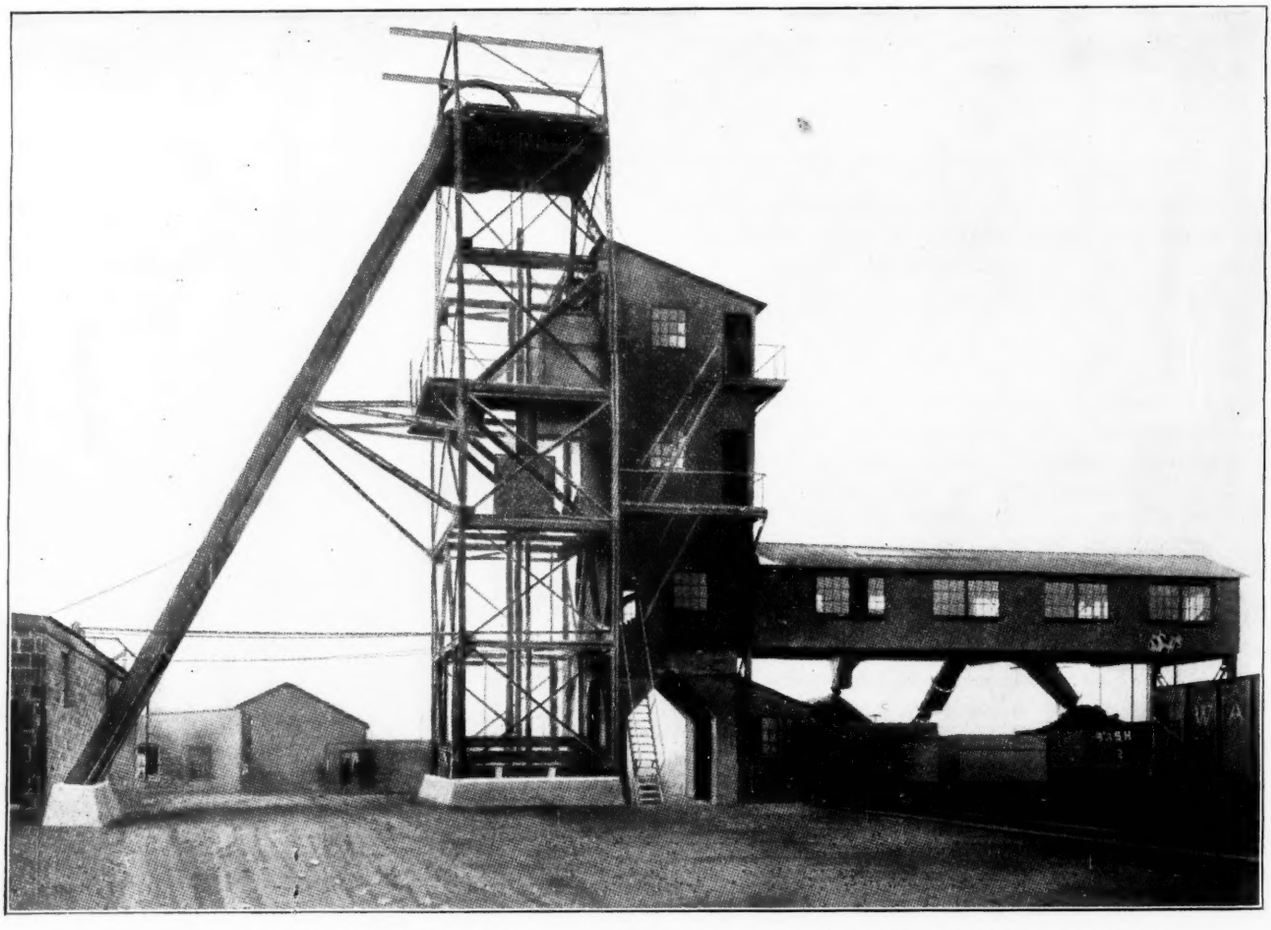


FIG. 1. NEW TIPPLE AND HEADFRAME, CENTRAL MINE, WOODSIDE COAL CO., SPRINGFIELD, ILL.

Underground, the mine was in every respect modern and well-equipped, but the top works, consisting of the power plant, tipple, retail bins, shops, fan, barn, office building, etc., were of wood construction, built perhaps 20 years ago.

Nearly a dozen men and all of the company's mules were below at the time of the fire, but fortunately no lives were lost.

the power plant, attention was turned toward a general removal of débris, so that the track scales could be repaired and the cribbing and coping about the cageways reconstructed, it having been badly damaged to a depth of about 15 ft. Also the building for housing the shop tools was made ready, together with its equipment, such as the steam hammer, drill press, grinder, forge and blower, so that the workmen were provided with ample

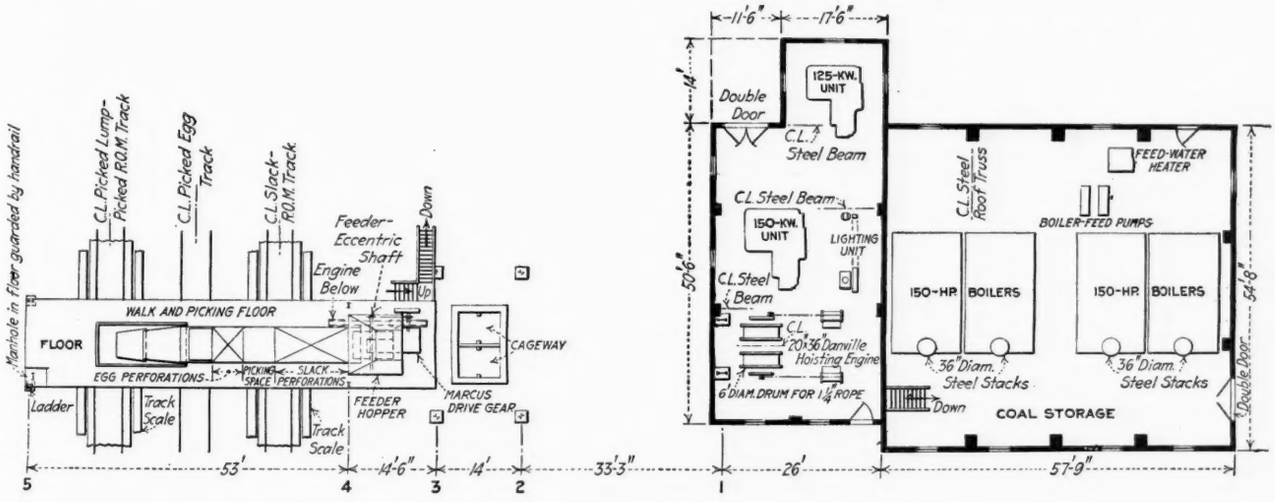


FIG. 2. GENERAL ARRANGEMENT OF TIPPLE AND POWER PLANT IN PLAN VIEW

The most difficult part of this sudden problem was the rebuilding of the tipple and the power plant, as the former had to be reconstructed of steel and the latter of the most economical material that could be secured immediately.

However, the most urgent of all was the fan. One of the four 150-hp. boilers was quickly put into service and a temporary steam line erected and connected to the fan engine. By Nov. 21 these repairs were completed and the fan was operating, terminating further hardship to the mules and permitting work to be done underground.

With a start made on all these units, and repairs well under way on the electrical and steam equipment in facilities for performing the greater repair and reconstruction work which was planned to follow; that is, the power plant and the tipple, especially the latter.

The layout of the top works of the Woodside Coal Co. is clearly shown in Fig. 4. A side elevation of the Marcus tipple and power plant is shown in Fig. 3.

It will be noted that the construction and operation are very simple. The pit cars are hoisted and dumped by self-dumping cages, the coal going immediately from the dump chute to the weigh hopper, in which it is held until the weight of each dump is recorded. A pair of standard 10-ton tipple scales is provided with the scale beam conveniently arranged in the weighroom for taking the weight of these dumps. The coal is then lowered into the feeder hopper directly underneath, from which it is discharged by a reciprocating feeder to the Marcus screen uniformly at the rate of 250 tons per hour.

The Marcus screen is constructed of two decks, the upper one having screen plates with 1¼-in. round perforations for passing the slack coal and 5-in.

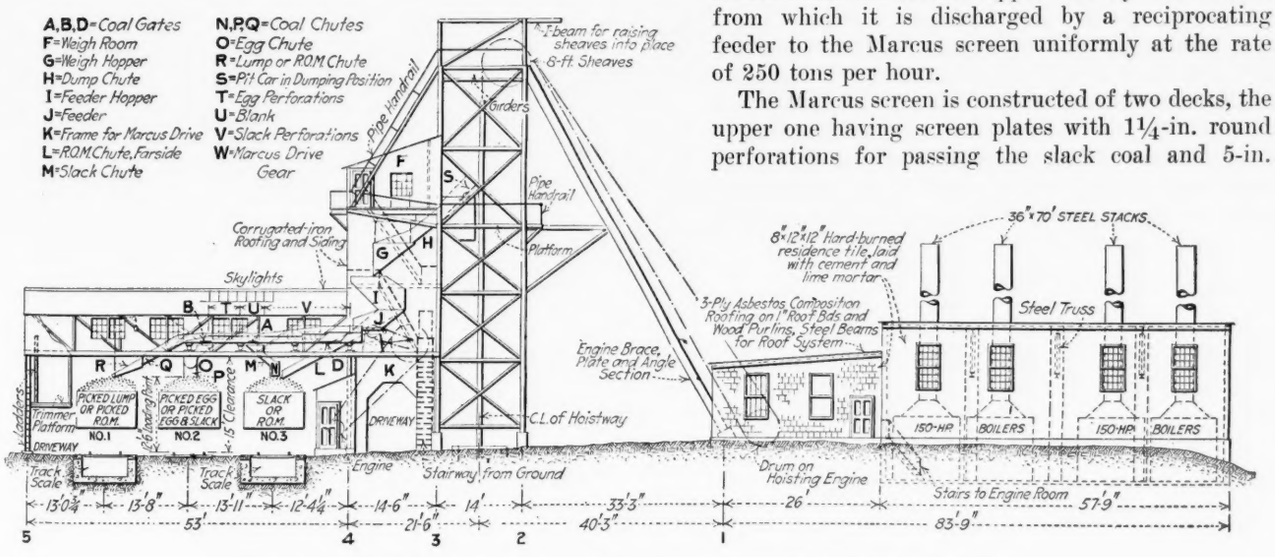


FIG. 3. SIDE ELEVATION OF THE MARCUS TIPPLE AND POWER PLANT

round perforations for removing the egg coal. Between these two sets of screens on the upper deck there is provided a blank area for inspecting and picking the coal. The slack coal moves along the bottom deck and passes through gate *A* and chute *N* to cars on track No. 3, while the picked egg coal passes through gate *B* and chute *P* to cars on track No. 2. The oversized or picked lump coal is delivered through chute *Q* to cars on track No. 1.

If it is desired to make picked run-of-mine, gates *A* and *B* on the Marcus screen are closed and all of the coal is loaded into cars on track No. 1. For an emergency, provision is made to load run-of-mine on track No. 1 without running any of the screening machinery. Gate *D* is arranged in the screen to deliver slack coal to a boiler-house conveyor for furnishing the boilers with fuel.

The plant has a large retail trade supplied by wagons which will receive the coal from bins located on the up-track side of the tipple. These retail bins will receive their supply of coal from a chain and flight conveyor which is fed from the feeder hopper.

A vertical steam engine is located in a small building between track No. 3 and the driveway, and a belt drive is taken directly to the drive wheel on the Marcus drive

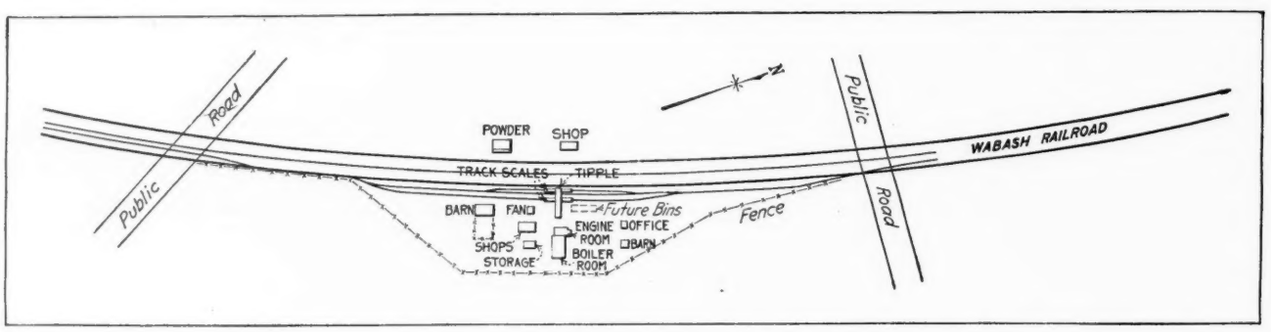


FIG. 4. LAYOUT OF THE TOP WORKS OF WOODSIDE COAL CO.

gear. This engine drive and the feeder constitute all the machinery for operating the screening equipment.

It will be observed in Fig. 2 that the screening shed spans all three tracks, which arrangement gives a clear working space around the tipple—quite an advantage, as the track scales and their scale beams therefore are more accessible.

Fig. 2 shows the general arrangement of the power plant and the tipple in plan view. The engine room contains 125- and 150-kw. direct-connected units, also a small lighting unit and a pair of 20x36-in. Danville hoisting engines. All of these were considerably damaged, and quite extensive repair work was necessary.

In the boiler room are four 150-hp. boilers, a Cochrane feed-water heater and two feed-water pumps, which were damaged very little. The steam and water piping could only partly be used, while the four steel stacks were blown down by a high wind and completely ruined.

The housing around this equipment was replaced with hard-burned tile built around steel roof trusses on I-beam posts and overlaid with wood purlins and roof boards and a three-ply asbestos composition roofing.

The plant represents the most modern practice in tipple and plant construction; it is easily operated and maintained and adequate for the capacity and preparation of coal demanded.

Neutralizer of Dynamite Gases

Douglas Lay, of London, England, in a recent issue of the *Engineering and Mining Journal* states that at the Van-Roi mine, Silverton, B. C., much benefit was found to result from the use of a small quantity of an explosive called "steelite" (essentially chlorate of potash with a small admixture of other substances) in conjunction with the usual charge of 40 per cent. dynamite.

At the time of trial a connection was being made between two levels, 250 ft. apart vertically, at a point some 2,000 ft. distant from the portal of the lower level. The connection was in the form of a raise to a drift followed by another raise, and ventilation was extremely bad. Using 40 per cent. dynamite alone, even with the liberal use of compressed air for blowing out the gas, it was hardly possible to work one shift per 24 hr. in driving this connection. As chlorate of potash yields free oxygen on detonation, the idea occurred to use this "steelite" explosive as a neutralizer of dynamite gases. One stick of "steelite" was placed in the bottom of each hole, followed by the ordinary charge of 40 per cent. dynamite. The result from a "gas killing" point of view was so successful that it was thereafter found possible to work two shifts per 24 hr. in this heading without any ill effects from gas.

The use of many so-called "fumicides" for the purpose of neutralizing dynamite gases has been shown by the United States Bureau of Mines to be quite improper and to actually increase the amount of carbon monoxide present in the gases after explosion. Potassium chlorate is certainly free from this objection, and in the proportion of say 1 part of chlorate to 6 parts of the ordinary explosive, it appears to be well worth a trial in badly ventilated workings or in development faces in tight ground. In the latter case a cut has invariably to be blasted first, making two blasts to the complete round and causing an inevitable loss of time while the men are waiting for the gas and smoke to clear away. The best way to use chlorate of potash appears to be to wrap it in paper and put it in the bottom of the hole, followed by the customary charge of dynamite.

Miner's Home Frees Him from Tuberculosis—"In nearly all cities you will find crowded tenements. Congested theaters and street cars are conducive to the propagation of tubercular, pneumonia and grip germs. Pneumonia, tuberculosis and grip are rare in mining camps because the homes are usually sufficiently separated, there are no street cars, playhouses are not common and rooms are rarely overcrowded. The homes of many miners are well ventilated, well lighted, warm, attractive and clean," says Dr. W. A. Lynott, United States Bureau of Mines.

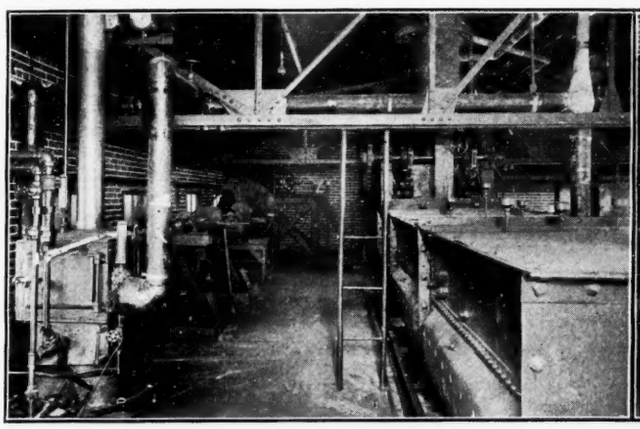
Distillation of Colorado Lignite

By A. J. Hoskin*

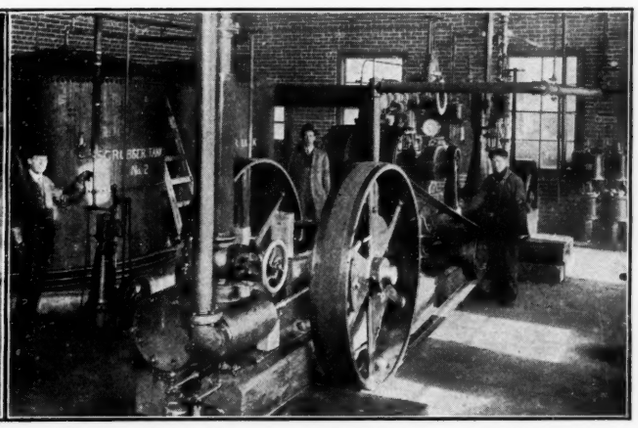
SYNOPSIS—A plant has been constructed in Denver for the production of briquettes, gas, light oils, creosote, pitch and ammonium sulphate from Colorado lignite. The briquettes are quite stable and contain slightly over 14,000 B.t.u. per lb. The gas evolved is at present in large part wasted, but will of course be eventually utilized commercially.

The United States Bureau of Mines recently published Bulletin No. 89, entitled "Economic Methods of Utilizing Western Lignites," but this fails to make note of certain exhaustive research work that has been carried on in Denver along the same lines by Charles O. Hoover. It is the object of this article to explain some of this research.

In the heart of Denver's manufacturing center the American Coal Refining Co. has four acres of land upon which it has for the past year and a half been constructing a plant to commercialize certain facts demonstrated by Mr. Hoover. At this writing the company has expended more than one-quarter of a million dollars in improvements and construction, yet few persons are aware of its activities. The plant is nearing completion, but plans are already made for the immediate doubling of its capacity, which will be initially the treatment of 500 tons of raw lignite per day.



MIXER IN THE BRIQUETTING PLANT



INTERIOR OF GAS REFINERY

The company was incorporated March 13, 1914. Its offices are at 730-735 First National Bank Building and its officers are C. V. Fisher, president; Charles O. Hoover, vice-president and chief engineer; S. C. Peck, secretary and assistant treasurer; W. J. Stevenson, treasurer. In addition to Messrs. Fisher, Hoover and Stevenson, the board of directors includes Dr. G. S. Peck and F. P. Lillie.

The works of the company are at Seventh and Wazee St. Mr. Hoover personally owns a most complete research laboratory at 2042 Champa St., wherein he has for two years or more maintained a staff of able chemists who have performed a tremendous amount of physical and chemical investigation along the lines undertaken by the company. This laboratory will continue as the research department for this company's work, but a very complete commercial laboratory has been built at the plant for routine purposes.

The project covered by this company's research and construction is the commercial low-temperature distillation of lignite, with the production of numerous valuable substances, solid, liquid and gaseous. The coal is purchased under contract from mines in the northern Colorado field. The products from this material are a type of superior briquettes called "carbonets," light oils, creosote and pitch (with many derivatives) and fuel gas. Before explaining the proportions and properties of these products, it will be well to follow the flowsheet.

Coal, received in standard-gage dump cars, is weighed in at the upper end of the yard. The cars are then drawn by means of an electrically driven winding drum and cable to the track hopper to be dumped. This hopper discharges into an inclined pan conveyor that delivers the crude lignite to a 24-in. roll crusher. This crusher reduces the coal to 1-in. size. A bucket elevator then carries the lignite to overhead storage bins of 120 tons' capacity. The track hopper, conveyor, crusher and elevator were furnished by the Jeffrey Manufacturing Co.

The steel storage bins are provided with a multi-conical discharge bottom through which the coal is loaded into a specially designed four-hopper larry, each hopper of which holds 2½ tons. This larry conveys its 10-ton charge to the four charging doors in the tops of each of four parallel ovens built in close battery. The storage or *A* bins and the larry were built in Denver by the Vulcan Sheet Metal Co. from special designs.

Each oven is charged at intervals of 2½ hours and operates independently of its neighbors. It is 36 ft. long, 9 ft. high and 18 in. wide and is lined with a special brick manufactured by the Colorado Crucible and Clay Co. Within the walls are horizontal, longitudinal flues, in which flame and hot gases are circulated from gas burners located at the front ends. After leaving these flues, the hot gases of combustion are passed through the boilers of the power plant in an adjacent building. A feature of these ovens for which patent has

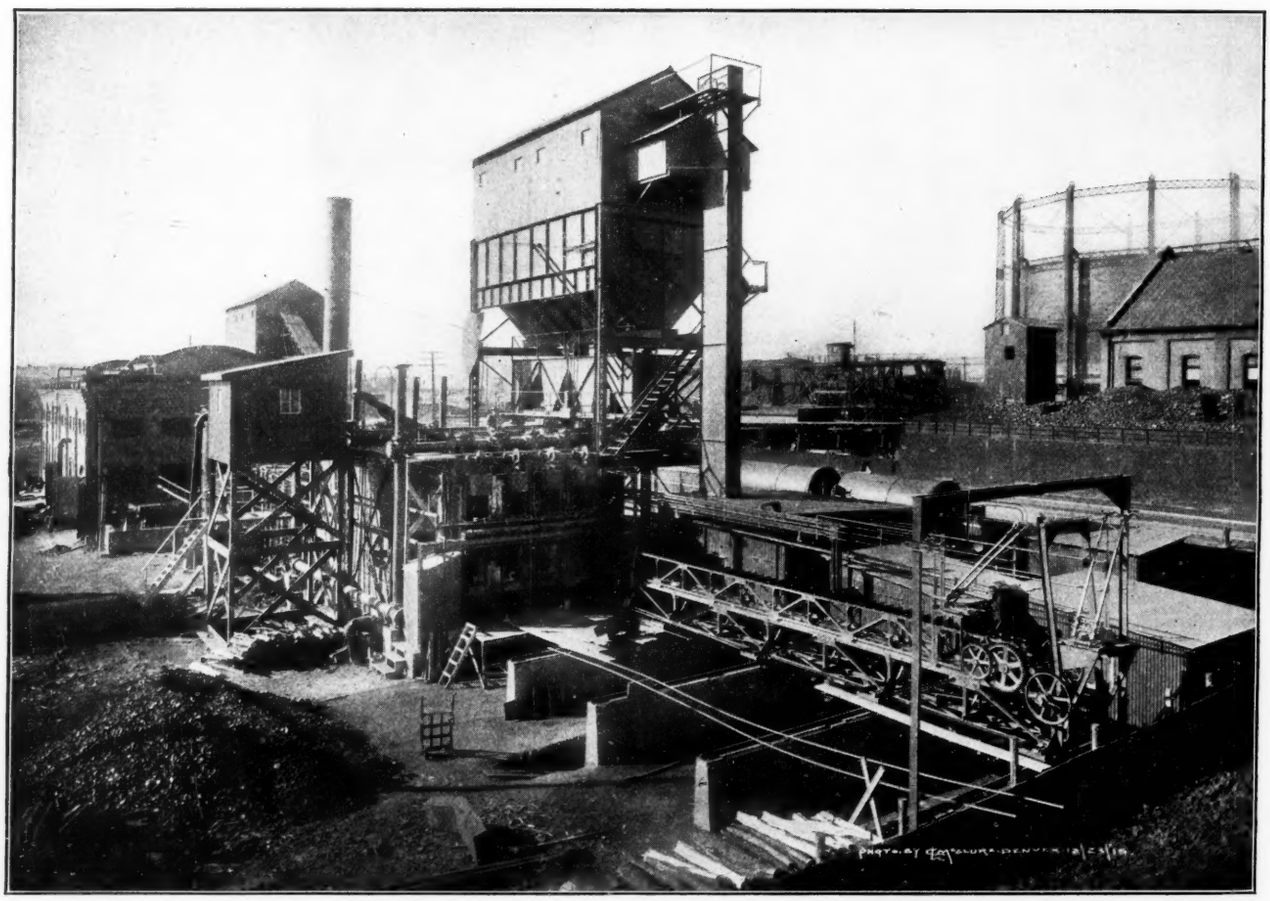
*308 Commonwealth Building, Denver, Colo.

been applied is the passage of previously manufactured fuel gas through flues beneath the floors of the ovens and up through the mass of baking lignite. The gas in this way becomes more heavily charged or enriched.

The ovens are sealed as tight as possible in order that the baking or distillation of the coal may be conducted without the admission of oxygen from the atmosphere. The raw charge is found to average about 1 per cent. oxygen, aside from that contained in the water carried by the coal. After sealing, the temperature of the oven is slowly raised to 500° C., recording pyrometers being observed to note the stages. The distillation period averages about two hours, during which there are removed about 10,000 cu.ft. of gas, 13 gal. of tar and 2½ lb.

The tar from the distillates is collected in a tank, from which it is drawn into a preheater and then into the tar still, which has a capacity of 20 tons and is gas-fired. At temperatures up to 150° C. from 10 to 14 per cent. of light oils pass over to a storage tank. From 150° to 325° C., about 68 per cent. of creosote is delivered to the heavy-oil tank. The residue, amounting to about 18 per cent. of the original charge in the still, is hard black pitch, very low in free carbon. The creosote has been experimented with and found by experts to be an excellent grade of oil for the separation of minerals by flotation.

The water used in the condensing apparatus is circulated by pumps through pipes to a tower cooler erected



GENERAL VIEW OF THE BYPRODUCT PLANT

of ammonium sulphate per ton of lignite in the charge. The gases of distillation are directed through the usual types of mains, an exhauster, scrubbers and condensers. Two scrubbing tanks containing tar oil of a high boiling point absorb benzol. Three electrical precipitating units next remove all other nongaseous matter. Each such unit consists of a 10-ft. length of 10-in. pipe standing upright, with a piano-wire electrode centrally suspended. The current is used at 60,000 volts. The refined gas is then conducted through long mains across the yards to a storage gasometer of 3,065 cu.ft. capacity, this being a temporary affair of sufficient capacity only to amply supply the needs of the plant itself, all surplus gas at present being wasted. Eventually, large gasometers will be installed for commercial storage. From the gasometer, the gas is returned to the plant through a Buffalo gas exhauster.

on the opposite side of the grounds and then back to the plant.

The carbon residue remaining in the ovens after the distillation of the raw coal is removed by a specially designed discharger built by the Vulcan Sheet Metal Co. This is electrically operated and is capable of travel in two horizontal directions. It is a long structural-steel framework carrying a dragchain conveyor, the overall width being such as to permit it to pass longitudinally into the 18-in. ovens. Upon completion of distillation in any oven, the discharger is spotted directly in front of that oven's lower front door, the door is lifted and the discharger slowly enters, pulling out the hot residue, which drops into a cast-iron screw conveyor set across the lower front end of the battery of ovens.

As the material drops into this conveyor it is subjected to a spray of water to quench any combustion that

might otherwise occur when the heated carbon residue comes into contact with air. This conveyor carries the residue to a screw conveyor 38 ft. long, set at an inclination of 12°. This, in turn, discharges into a double-jacketed trommel, the inner screen of which has ½-in. meshes, while the outer screen has ¼-in. meshes. Both oversize products pass to a 4½x4½-ft. Denver Engineering Works ball mill that reduces the carbon to less than ¼ in. in size. This fine material joins the through products from the screens and is taken by a flight conveyor 160 ft. long up a slope of 20° into the B storage bins. Up to this point in the flowsheet all the units are designed for a capacity of 60 tons per hour.

The B bins comprise one central hopper of 100 tons' capacity and one hopper at each end with a capacity of 10 tons. One of the small bins is for the storage of a solid substance used in the binder for briquetting; the other small bin is for fines returned from briquetting. The main, or central, bin receives the ground carbon residue already described. From these last hopper bins the three sorts of material are taken by trough conveyors, timed by trains of gears from a single lineshaft, to a screw conveyor in the briquetting building. This conveyor delivers the mixed materials over a magnetic pulley (for the removal of foreign particles of iron) and then to a 6x30-ft. revolving, cylindrical preheater, using superheated steam at 450° F. in jackets. From this preheater the materials are elevated to a hopper, from which they pass by a chain conveyor to the mixer.

The Briquette Ingredients Are Thoroughly Mixed

The mixer is a horizontal steel-plate trough with a rounded bottom, 4 ft. wide, 18 ft. long, and containing three longitudinal shafts, each provided with multiple mixing arms. The shell of this machine is jacketed, the first two jackets toward the feed end being fed with steam for maintaining a suitable temperature during the early stages of the mixing operation. The third jacket, at the discharge end, uses compressed air for the purpose of lowering the temperature after the mixing is accomplished. As the dry materials are fed into this machine, molten pitch is added in small proportion. This pitch, one of this plant's products, is melted in an upright steel cylindrical tank 6 ft. in diameter and 14 ft. high. The fuel, at present, is carbonets, but it will ultimately be the gas made by the company and previously described. Compressed air is admitted into the top of this airtight tank under a pressure of 4½ lb. per sq.in. and forces the molten pitch up through a pipe into the feed end of the mixer.

From the mixer the briquetting materials are taken by a flight conveyor of special design which is supplied with compressed air for the purpose of further cooling the substances on their way to the press. The stuff enters the double-roll press through a feeding device that assures a uniform supply for briquetting.

The press was built by the Denver Engineering Works. Each roll has 328 cavities, is 32⅜ in. in diameter and has a 16¾-in. face. The rolls run at 15 r.p.m. and will briquette 25 tons per hour, each carbonet weighing a trifle over 3 oz.

As the carbonets leave the rolls in a rapid stream they are taken by a belt conveyor to the exterior of the building and onto a moving grizzly, where they are sprayed with water to cool them as well as to remove the small amount of fines that are inevitably produced. From the grizzly, a second belt conveyor, with swivel arrangement, carries the carbonets to the yard storage.

The analysis of the average raw lignite used by the company is as follows: Moisture, 12.01 per cent.; volatile matter, 29.19 per cent.; fixed carbon, 55 per cent.; ash, 3.80 per cent.; heat content, 9,935 B.t.u.

The carbonets manufactured from the residue of this coal are remarkably uniform in texture and composition. Their analysis averages as follows: Moisture (4 hr. at 105° C.), 1.34 per cent.; combustible volatile matter, 7.60 per cent.; fixed carbon, 84.04 per cent.; ash, 7.02 per cent.; heat content 14,061 B.t.u.

The binder used is, as explained, both a solid (whose composition is maintained a secret) and a small amount of pitch. This binder itself has a heat value of over 18,000 B.t.u. and contains 99 per cent. of matter soluble in carbon disulphide (CS_2). The carbonets, being composed largely of fixed carbon, are very stable. They withstand weathering effectually, will endure rough handling and, when burned, retain their form until practically consumed. Some of these carbonets were experimentally sealed in crucibles that were kept at a temperature of 1,000° C. in an electric furnace for 30 min. Upon cooling, they were found to have coked, thus proving the possibility of producing coke from lignite.

A noteworthy feature of this company's plant is the unit-drive system installed in every department. Centrally located switchboards carrying circuit breakers enable an operator to control any machine.

Acknowledgments are due to Mr. Hoover for the facts and figures herein quoted and to Mr. Peck and Mr. Fisher for courtesies rendered.

Prevention of Corrosion in Pipe

Some interesting experiments on the prevention of corrosion in pipe have been made by F. M. Speller, the results of which were presented at the annual meeting of the American Society of Heating and Ventilating Engineers in January, 1916.

Regarding the corrosion and pitting of pipe, the conclusions were that the remedy seems to lie in the elimination of dissolved oxygen from water before use. In practice this may be accomplished by allowing the hot water to come to rest for a few minutes under greatly reduced pressure, which must be below normal, or by raising the temperature nearly to the boiling point with the water at atmospheric pressure, to get proper separation of oxygen and other gases.

The author tried an alternative method of reducing corrosion in water lines, by satisfying or fixing the free oxygen. In this method clean iron turnings were used to remove the oxygen from the water. The rate of rusting varies with the surface conditions of the plate.

The paper concludes: "However, it appears well within the bounds of possibility to predict that deaëration of the water, through the use of plants designed with this end in view, should at moderate expense increase the life of some piping systems four or five times. Such a possibility of conservation of material is surely worthy of careful consideration by engineers." A copy of this interesting paper by Mr. Speller may be obtained on application to the National Tube Co., Pittsburgh, Penn.

Table for Computing the Mine Yardage

By V. S. Veazey*

The accompanying table, computed for the employees of the McKell Coal and Coke Co., presents a convenient means for reducing the amount of the yardage to the amount due and at the same time eliminating any possibility of error. Custom has decreed that measurements of this character shall be made in yards, a unit that the engineer seldom uses; and while the computation involved in reducing feet to yards is of the most elementary character, the work of changing a large number of these measurements will require considerable time, particularly when this must later be supplemented by computing the amount due at a certain price per yard. As will be noted, the amount due is computed for each foot of measurement from 3 to 90 ft., with the equivalent given in yards and fractions, and for various prices per yard ranging from 50c. to $4, with a variable unit of 25c.

Yardage is usually measured monthly, the previous measurement being shown by a paint mark on the rib or otherwise. Measurements are made to the nearest foot, the rate per yard being governed by special conditions in each place, such as narrowwork, slate, water, bad roof, etc. For example: The main entry had been driven 83 ft. at a rate of $1.75 per yard. The table gives 83 ft., which is 27⅔ yd., and at $1.75 this is $48.42.

*Chief engineer, McKell Coal and Coke Co., Glen Jean, W. Va.

Rate per Yard	Feet..	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Yards.	1	1⅓	1⅔	2	2⅓	2⅔	3	3⅓	3⅔	4	4⅓	4⅔	5	5⅓	5⅔	6	6⅓	6⅔	7	7⅓	7⅔	8
	$0.50	0.50	0.67	0.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00	3.17	3.33	3.50	3.67	3.83	4.00
	0.75	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
	1.00	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33	6.67	7.00	7.33	7.67	8.00
	1.25	1.25	1.67	2.08	2.50	2.91	3.33	3.75	4.17	4.58	5.00	5.42	5.83	6.25	6.67	7.08	7.50	7.92	8.33	8.75	9.17	9.58	10.00
	1.50	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00
	1.75	1.75	2.33	2.92	3.50	4.08	4.67	5.25	5.83	6.42	7.00	7.58	8.17	8.75	9.33	9.92	10.50	11.08	11.67	12.25	12.83	13.42	14.00
	2.00	2.00	2.67	3.33	4.00	4.67	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00	10.67	11.33	12.00	12.67	13.33	14.00	14.67	15.33	16.00
	2.25	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25	12.00	12.75	13.50	14.25	15.00	15.75	16.50	17.25	18.00
	2.50	2.50	3.33	4.17	5.00	5.83	6.67	7.50	8.33	9.17	10.00	10.83	11.67	12.50	13.33	14.17	15.00	15.83	16.67	17.50	18.33	19.17	20.00
	2.75	2.75	3.67	4.58	5.50	6.42	7.33	8.25	9.17	10.08	11.00	11.92	12.83	13.75	14.67	15.58	16.50	17.42	18.33	19.25	20.17	21.08	22.00
	3.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
	3.25	3.25	4.33	5.42	6.50	7.58	8.67	9.75	10.83	11.92	13.00	14.08	15.17	16.25	17.33	18.42	19.50	20.58	21.67	22.75	23.83	24.92	26.00
	3.50	3.50	4.67	5.83	7.00	8.17	9.33	10.50	11.67	12.83	14.00	15.17	16.33	17.50	18.67	19.83	21.00	22.17	23.33	24.50	25.67	26.83	28.00
	3.75	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50	13.75	15.00	16.25	17.50	18.75	20.00	21.25	22.50	23.75	25.00	26.25	27.50	28.75	30.00
	4.00	4.00	5.33	6.67	8.00	9.33	10.67	12.00	13.33	14.67	16.00	17.33	18.67	20.00	21.33	22 67	24.00	25.33	26.67	28.00	29.33	30.67	32.00

Rate per Yard	Feet..	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	Yards.	8⅓	8⅔	9	9⅓	9⅔	10	10⅓	10⅔	11	11⅓	11⅔	12	12⅓	12⅔	13	13⅓	13⅔	14	14⅓	14⅔	15	15⅓	15⅔
	$0.50	4.17	4.33	4.50	4.67	4.83	5.00	5.17	5.33	5.50	5.67	5.83	6.00	6.17	6.33	6.50	6.67	6.83	7.00	7.17	7.33	7.50	7.67	7.83
	0.75	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75
	1.00	8.33	8.67	9.00	9.33	9.67	10.00	10.33	10.67	11.00	11.33	11.67	12.00	12.33	12.67	13.00	13.33	13.67	14.00	14.33	14.67	15.00	15.33	15.67
	1.25	10.42	10.83	11.25	11.67	12.08	12.50	12.92	13.33	13.75	14.17	14.58	15.00	15.42	15.83	16.25	16.67	17.08	17.50	17.92	18.33	18.75	19.17	19.58
	1.50	12.50	13.00	13.50	14.00	14.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50
	1.75	14.58	15.17	15.75	16.33	16.92	17.50	18.08	18.67	19.25	19.83	20.42	21.00	21.58	22.17	22.75	23.33	23.92	24.50	25.08	25.67	26.25	26.83	27.42
	2.00	16.67	17.33	18.00	18.67	19.33	20.00	20.67	21.33	22.00	22.67	23.33	24.00	24.67	25.33	26.00	26.67	27.33	28.00	28.67	29.33	30.00	30.67	31.33
	2.25	18.75	19.50	20.25	21.00	21.75	22.50	23.25	24.00	24.75	25.50	26.25	27.00	27.75	28.50	29.25	30.00	30.75	31.50	32.25	33.00	33.75	34.50	35.25
	2.50	20.83	21.67	22.50	23.33	24.17	25.00	25.83	26.67	27.50	28.33	29.17	30.00	30.83	31.67	32.50	33.33	34.17	35.00	35.83	36.67	37.50	38.33	39.17
	2.75	22.92	23.83	24.75	25.67	26.58	27.50	28.42	29.33	30.25	31.17	32.08	33.00	33.92	34.83	35.75	36.67	37.58	38.50	39.42	40.33	41.25	42.17	43.08
	3.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00
	3.25	27.08	28.17	29.25	30.33	31.42	32.50	33.58	34.67	35.75	36.83	37.92	39.00	40.08	41.17	42.25	43.33	44.42	45.50	46.58	47.67	48.75	49.83	50.92
	3.50	29.17	30.33	31.50	32.67	33.83	35.00	36.17	37.33	33.50	39.67	40.83	42.00	43.17	44.33	45.50	46.67	47.83	49.00	50.17	51.33	52.50	53.67	54.83
	3.75	31.25	32.50	33.75	35.00	36.25	37.50	38.75	40.00	41.25	42.50	43.75	45.00	46.25	47.50	48.75	50.00	51.25	52.50	53.75	55.00	56.25	57.50	58.75
	4.00	33.33	34.67	36.00	37.33	38.67	40.00	41.33	42.67	44.00	45.33	46.67	48.00	49.33	50.67	52.00	53.33	54.67	56 00	57.33	58.67	60.00	61.33	62.67

Rate per Yard	Feet..	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	Yards.	17	16⅓	16⅔	17	17⅓	17⅔	18	18⅓	18⅔	19	19⅓	19⅔	20	20⅓	20⅔	21	21⅓	21⅔	22	22⅓	22⅔	23	23⅓
	$0.50	8.00	8.17	8.33	8.50	8.67	8.83	9.00	9.17	9.33	9.50	9.67	9.83	10.00	10.17	10.33	10.50	10.67	10.83	11.00	11.17	11.33	11.50	11.67
	0.75	12.00	12.25	12.50	12.75	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00	15.25	15.50	15.75	16.00	16.25	16.50	16.75	17.50	17.25	17.50
	1.00	16.00	16.33	16.67	17.00	17.33	17.67	18.00	18.33	18.67	19.00	19.33	19.67	20.00	20.33	20.67	21.00	21.33	21.67	22.00	22.33	23.67	24.00	24.33
	1.25	20.00	20.42	20.83	21.25	21.67	22.08	22.50	22.92	23.33	23.75	24.17	24.58	25.00	25.42	25.83	26.25	26.67	27.08	27.50	27.92	28.33	28.75	29.17
	1.50	24.00	24.50	25.00	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00	30.50	31.00	31.50	32.00	32.50	33.00	33.50	34.00	34.50	35.00
	1.75	28.00	28.58	29.17	29.75	30.33	30.92	31.50	32.08	32.67	33.25	33.83	34.42	35.00	35.58	36.17	36.75	37.33	37.92	38.50	39.08	39.67	40.25	40.83
	2.00	32.00	32.67	33.33	34.00	34.67	35.33	36.00	36.67	37.33	38.00	38.67	39.33	40.00	40.67	41.33	42.00	42.67	43.33	44.00	44.67	45.33	46.00	46.67
	2.25	36.00	36.75	37.50	38.25	39.00	39.75	40.50	41.25	42.00	42.75	43.50	44.25	45.00	45.75	46.50	47.25	48.00	48.75	49.50	50.25	51.00	51.75	52.50
	2.50	40.00	40.83	41.67	42.50	43.33	44.17	45.00	45.83	46.67	47.50	48.33	49.17	50.00	50.83	51.67	52.50	53.33	54.17	55.00	55.83	56.67	57.50	58.33
	2.75	44.00	44.92	45.83	46.75	47.67	48.58	49.50	50.42	51.33	52.25	53.17	54.08	55.00	55.92	56.83	57.75	58.67	59.58	60.50	61.42	62.33	63.25	64.17
	3.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57 00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00
	3.25	52.00	53.08	54.17	55.25	56.33	57.42	58.50	59.58	60.67	61.75	62.83	63.92	65.00	66.08	67.17	68.25	69.33	70.42	71.50	72.58	73.67	74.75	75.83
	3.50	56.00	57.17	58.33	59.50	60.67	61.83	63.00	64.17	65.33	66.50	67.67	68.83	70.00	71.17	72.33	73.50	74.67	75.83	77.00	78.17	79.33	80.50	81.67
	3.75	60.00	61.25	62.50	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
	4.00	64.00	65.33	66.67	68.00	69.33	70.67	72.00	73.33	74.67	76.00	77.33	78.67	80.00	81.33	82.67	84.00	85.33	86.67	88.00	89.33	90.67	92.00	93.33

Rate per Yard	Feet.....	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
	Yards...	23⅔	24	24⅓	24⅔	25	25⅓	25⅔	26	26⅓	26⅔	27	27⅓	27⅔	28	28⅓	28⅔	29	29⅓	29⅔	30
	$0.50	11.83	12.00	12.17	12.33	12.50	12.67	12.83	13.00	13.17	13.33	13.50	13.67	13.83	14.00	14.17	14.33	14.50	14.67	14.83	15.00
	0.75	17.75	18.00	18.25	18.50	18.75	19.00	19.25	19.50	19.75	20.00	20.25	20.50	20.75	21.00	21.25	21.50	21.75	22.00	22.25	22.50
	1.00	23.67	24.00	24.33	24.67	25.00	25.33	25.67	26.00	26.33	26.67	27.00	27.33	27.67	28.00	28.33	28.67	29.00	29.33	29.67	30.00
	1.25	29.58	30.00	30.42	30.83	31.25	31.67	32.08	32.50	32.92	33.33	33.75	34.17	34.58	35.00	35.42	35.83	36.25	36.67	37.08	37.50
	1.50	35.50	36.00	36.50	37.00	37.50	38.00	38.50	39.00	39.50	40.00	40.50	41.00	41.50	42.00	42.50	43.00	43.50	44.00	44.50	45.00
	1.75	41.42	42.00	42.58	43.17	43.75	44.33	44.92	45.50	46.08	46.67	47.25	47.83	48.42	49.00	49.58	50.17	50.75	51.33	51.92	52.50
	2.00	47.33	48.00	48.67	49.33	50.00	50.67	51.33	52.00	52.67	53.33	54.00	54.67	55.33	56.00	56.67	57.33	58.00	58.67	59.33	60.00
	2.25	53.25	54.00	54.75	55.50	56.25	57.00	57.75	58.50	59.25	60.00	60.75	61.50	62.25	63.00	63.75	64.50	65.25	66.00	66.75	67.50
	2.50	59.17	60.00	60.83	61.67	62.50	63.33	64.17	65.00	65.83	66.67	65.50	68.33	69.17	70.00	70.83	71.67	72.50	73.33	74.17	75.00
	2.75	65.08	66.00	66.92	67.83	68.75	69.67	70.58	71.50	72.42	73.33	74.25	75.17	76.08	77.00	77.92	78.83	79.75	80.67	81.58	82.50
	3.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00
	3.25	76.92	78.00	79.08	80.17	81.25	82.33	83.42	84.50	85.58	86.67	87.75	88.83	89.92	91.00	92.08	93.17	94.25	95.33	96.42	97.50
	3.50	82.83	84.00	85.17	86.33	87.50	88.67	89.83	91.00	92.17	93.33	94.50	95.67	96.83	98.00	99.17	100.33	101.50	102.67	103.83	105.00
	3.75	88.75	90.00	91.25	92.50	93.75	95.00	96.25	97.50	98.75	100.00	101.25	102.50	103.75	105.00	106.25	107.50	108.75	110.00	111.25	112.50
	4.00	94.67	96.00	97. 3	98.67	100.00	101.33	102.67	104.00	105.33	106.67	108.00	109.33	110.67	112.00	113.33	114.67	116.00	117.33	118.67	120.00

Operation of the Shaker Screen

By John A. Garcia*

SYNOPSIS—The best-designed and most carefully constructed coal-preparation apparatus obtainable may give trouble in operation if not properly handled. Considerable delay and expense may be avoided if a periodic, preferably daily, inspection is made of all the equipment by a thorough mechanic who is personally intrusted with its maintenance.

The designer of coal-preparation equipment should always bear in mind the fact that the shaker screen usually receives less attention after it is once in operation than any other machine on the job. He should therefore work up the details, not only for rigidity and ruggedness, but for simplicity as well, since the little care this device will get will usually be from trimmers and topmen unskilled in handling or repairing complicated machinery.

A machine that will size from 1,000 to 4,000 tons in 8 hr. for from 200 to 300 days a year and endure for the life of the mine is a mechanical contrivance of which the builder may well feel proud, and it is difficult to understand why it is so neglected at most operations. The mining laws of many states provide that an examination and signed report by a competent man shall be made each day of the condition of cages, ropes, safety dogs, hoisting engines, etc., and although this is done to guard against accident to the men, it is well worth the trouble and slight expense as a preventive of wrecks and the destruction of equipment.

If the same care were exercised in daily examination of the screens as is employed with the other machinery, there would be few delays to operation charged up against the shakers on the time sheet, and the preparation of coal would be much more uniform and satisfactory.

A Thorough Periodic Inspection Should Be Made

It is recommended that some thoroughly competent person examine the entire screening outfit each day, either before or after the working shift—preferably after, since there would then be time to make any repairs found necessary. This inspection should not be made by the top boss or trimmer; the latter is not competent and the former usually has so many responsibilities and so much to do that he cannot be expected to give this machinery the time needed to examine it in detail and keep it in adjustment. The best results are obtained if the master mechanic, or if there is none such, one of the hoisting engineers, makes the inspection and the blacksmith or some other qualified man makes the repairs or adjustments and maintains the machine. It is suggested that the work be delegated to certain individuals and that they be held responsible, because everybody's job is nobody's job and the machinery will get better care if one man looks after it than it would with a dozen tinkerers.

If the shaker is of the roller type, the raceways should be kept clear of grit and packed coal dust, the rollers should be turned through an arc of 20 or 30 deg. each week to avoid flat wheels, and they should occasionally be checked for alignment. With shakers suspended by properly designed hangers there is no danger of creep or shock from flat wheels or dirty raceways, but there is danger of sideswing from loose hanger boxings, top and bottom, and these should be watched carefully. They should also be greased occasionally to prevent excessive wear and the annoying squeak of dry bearings.

The flys and doors in shaker screens are a source of much noise and trouble, and often a screen that sounds as if it were being shaken to pieces can be made practically noiseless by tightening up the lever of the fly-gates or wedging down a loose plate. Quite often wedge-shaped pieces of coal lodge in the perforations, especially those of the egg screen. These become grooved and cannot be dislodged except by hand; and it is "good medicine," both for the screens and for the preparation of the coal generally, to clear these holes occasionally during the working shift.

The under chutes, gate hinges and hopper doors should be overhauled occasionally and the degradation screens cleared of stuck coal whenever they show signs of clogging, as they sometimes will, especially when loading wet material.

The Connecting-Rods Should Have Special Care

The connecting-rods should receive close attention each day; especially must the crank end and the brasses be kept in shape, so that there will be no knock on the drive. The oil or grease cups on the cranks should be of the self-feed or compression type and large enough to hold more than one day's supply. There is no real reason why the main shaft boxes, the motor or engine base or any part of the driving mechanism should be loose and shifting about, as is frequently the case. It is easy to keep these parts rigid and in place, if they are once properly installed, and it costs less money and time, with fewer shutdowns and less profanity. If motor drive is used, care should be taken to see that the current is fairly constant, as violent fluctuations in speed are hard on the machinery and bad for the preparation.

The control for regulating the speed of the shaker should be placed where it is readily accessible to one man, preferably the dock boss or weighman; and he should be instructed to reduce speed to a minimum whenever the load is off the shaker, as nothing is so injurious and wearing to screens and structure as running at maximum or full-load speed when operating light or when no coal is being handled.

The weighpan, scales and feeder, especially the latter when of the continuous-feed design, should be examined carefully each day, and wherever the feeder slats show too much lost motion they should be adjusted by means of the take-ups at the rear end.

It is of course impossible to prevent dust and dirt from getting on the shaker drive of a coal tipple, and unless the motors are of the totally inclosed type, as they certainly should be, considerable trouble may be expected with armatures and fields. If open-type motors are used, they should be housed in and made as nearly dustproof as possible, but air ducts of some kind should be provided to ventilate the motor and keep down the temperature in the housing.

*Chicago, Ill.

No recommendations are made concerning the maintenance and care of the eccentrics on shaker drives. These are usually so troublesome on large screens that they receive considerable attention. It would in many cases be a good investment to throw them away and install cranks, the saving in power alone more than justifying the cost of the change.

The recording scale beam (the kind that stamps the weight on a ribbon or ticket) has been found to give quite satisfactory results, especially with rapid hoisting, and its cost is warranted by accurate weight and elimination of errors due to misreading the scale beam or setting down the wrong figures on the weigh sheet.

Light Screens Are Sometimes Troublesome

The light screens used in rescreening plants and washeries for sizing small coal seem to require more attention than the heavier shakers in the main tipple. This is probably because of the comparatively high speed and light construction of the former. Furthermore, these screens are much flatter and must be kept at a pitch of not less than 1 in. in 12 in., or the load will not move forward in right relation to the thrust of the driving-rods, thus causing unequal loading, undue stress in the hangers or struts and sagging or side-swaying of the screens.

These light screens give excellent results when they are maintained in adjustment, but cause unending grief and trouble when out of line or flattened down. It is, however, quite easy to keep them in condition, and broken hangers driving-rods and buckled plates are due to gross negligence or careless handling.

The percentage of small coal delivered to the rescreener from the main screens is not constant, and the fluctuating load on the light shaker makes necessary a stiff, rigid design of structure. As it is desirable to shut off power when out of coal at the hoist, to signal topmen when bins are full, etc., it is advisable to keep a man in charge of the screens during hoisting time. There should then be no excuse for improper operation or mismanipulation of this machine.

It ought to be a good investment to carry on the payroll a thoroughly competent and trained mechanic who will have charge of the tipple machinery, rescreening equipment, etc., although at smaller mines with just a shaker screen loading three to four sizes of coal, no company would be justified in employing a man simply to keep the screening equipment in shape. However, at the more modern mines, producing from 2,500 to 4,000 tons a day, loading domestic coal, making from five to eight sizes, and employing picking tables, loading booms, rescreening plants and all other necessary evils that must be used "to keep up with the procession" and compete in the domestic markets, it is a man-sized job to keep the entire outfit tuned up and ready at all times for maximum load.

The best design and workmanship on equipment is of little value with careless and incompetent operation. A first-class mechanic in charge, available repair parts and eternal vigilance will accomplish for the screening equipment just what they do for the generators, engines, cages or any other machines at a mine; namely, smooth operation, minimum repair costs, steady running and good preparation.

A Successful Mine Inspector

By Walton Rutledge*

SYNOPSIS—How the youngest man to ever receive the appointment as mine inspector in the United States made his way upward from a humble and unpropitious beginning.

I have been one of the state inspectors of mines in Illinois for a period of about 20 years. I might therefore write of various successful county inspectors who have served under me, but will confine myself to one in particular, T. C. Wright, of Belleville, Ill.

The state inspectors of Illinois are appointed for a term of two years, after passing a successful examination before a mining board composed of a mining engineer, two coal-mine operators and one coal miner. This board reports to the governor of the state the various ratings of the candidates and submits a recommendation for appointments.

The county inspectors of mines are appointed annually by the county board of the various counties. Under the Illinois mining law the county inspector works under the jurisdiction of the state inspector. The state inspector makes an annual report to the governor of the state. The county inspector makes an annual report to the mining committee of the county board.

T. C. Wright commenced to work in a factory when 11 years of age. There were six children in his father's family, and he being the oldest, had to start work young, and of course got but little schooling. At the age of 15 he began to work in a coal mine as a greaser boy at 75c. per day. At 16 years of age he commenced to drive a mule, and at the age of 18 he was engaged as fireman at the boilers on the surface and learned to run the hoisting engine at the mine. At this time he started to study mining and engineering with the correspondence schools at Scranton, Penn.

In 1902 he passed an examination as hoisting engineer before the mining board of Illinois and secured a position in this capacity at a mine, which position he held for several months. Being still desirous of obtaining more knowledge of coal mining, he commenced to mine coal with his father. He was then 21 years of age.

He mined coal for about three years. Being still desirous of obtaining more knowledge of mining and mining appliances, the nature of gases and the general operation of coal mines, he took a position caring for the various pumps in the mine. He worked as tracklayer, timberman, triprider, rope splicer, shotfirer for a time and at caging and as topman. He also acted as mine clerk, which position he held during the year 1904. In 1906 he passed before the mining board of the state as mine manager, being then 26 years old.

He then accepted a position as mine manager for a small coal company, which he held for three years. In 1908 he passed the miners' examining board at Belleville,

*Late state inspector of mines, 405 Market St., Alton, Ill.

and in April he was examined by the state mining board and passed in first aid in rescue work in mines.

In May, 1910, he was appointed by the St. Clair County board as county inspector of mines, reporting to me as state inspector for instructions. This position he still holds.

St. Clair County is one of the largest mining counties in Illinois. It has a total of 73 mines and an annual output of 4 to 5 million tons of 2,000 lb. each, with an average of 6,000 employees.

In September, 1912, T. C. Wright passed the state mining board as a state inspector of mines in Illinois, and in 1914 before the superintendent of public schools in St. Clair County, Illinois, he obtained a teacher's certificate to teach in any of the public schools in the county.

At 11 years of age, when he started to work in the factory, he had had but little schooling.

He went to a country school for five years, but this school was in session for only six months in the year, so he had only 30 months of actual attendance. His parents had no education and could not help him. They, however, furnished him money to buy books on coal mining, also to subscribe for the leading journals on this subject, and other mining literature. Whenever he had spare time from his work and sleep he was busy with his books.

When he reported to me that he had been appointed as county inspector of mines for St. Clair County, I was afraid the county board had made a mistake, as he looked too young. The Illinois mining law requires that inspectors of mines shall be at least 30 years of age. The county instruments used in mining had been turned over to him. I examined him on the use of the various instruments—barometer, water gage, safety lamp and measuring instruments—and he seemed to understand their use. After working with him for a number of years, I must say he has made good. He is at present teaching a class of young men, with a view of their becoming mine managers or inspectors of mines.

T. C. Wright is supposed to be the youngest man ever appointed inspector of mines in the United States of America, and he has done his duty; for if he had not done so, the county board would have removed him from office. During the time I was one of the state inspectors of coal mines in Illinois, having a district composed of five of the largest mining counties of the state, I have had several other county inspectors working with me, and I must say they have all done reasonably well, as they at present are holding positions as mine managers. Whenever a county inspector reported to me, after a lengthy conversation with him as regards the mining law and keeping notes, making reports and his duty under the mining law, I requested him to subscribe for the best journals treating on coal mines, and to secure the best reference books on coal mining, to keep true records, in going into the mines to carry his notebook with him, and on returning to transfer his records into a larger book kept in his office, so that if at any time he had to appear before the courts he would have a true record of his various inspections.

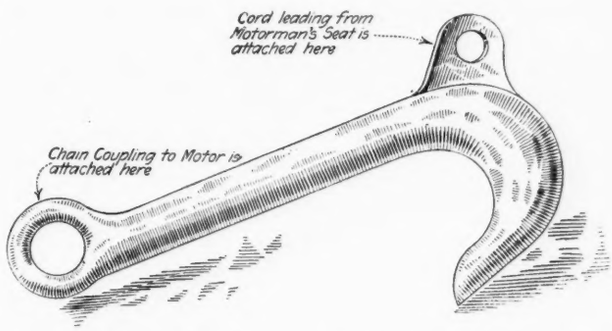
I kept a series of questions and anwers thereto given by the various county inspectors employed under my jurisdiction during their term of office when I was a state inspector. This I must state was a great benefit to the mine inspection service of the State of Illinois.

Coupling Hook for Mine Locomotives

The novel and useful coupling hook illustrated herewith was invented by John R. Jones, motorman on the 2,000-ft. level of the Leonard mine, at Butte. It is used in disconnecting a train of mine cars from the electric haulage locomotive when the train is connected to the end of the locomotive opposite to that at which the motorman's seat is situated.

The operation is simple and is accomplished by the motorman pulling a cord that is attached to the hook at the offset eye. This causes the hook to turn in the connecting-chain link and to be disengaged from it.

In some cases it is necessary to have a man on the train to do this work, and the uncoupling is often done while the train is in motion. Needless to say, this is a dangerous practice and one in which the men are not supposed to indulge. The use of this hook makes it unnecessary for a man to get his hands and arms between the locomotive and the cars when he uncouples them, and in some places it will save the labor of one man on the train.



COUPLING HOOK FOR MINE-HAULAGE MOTORS

The locomotives on the 2,000- and 1,800-ft. levels of the Leonard mine have been equipped with these hooks, and they have proved satisfactory.—*The Anode.*

COMING MEETINGS

American Society of Civil Engineers will hold its annual convention at Pittsburgh, Penn., June 27-30.

Illinois and Wisconsin Retail Coal Dealers Association will hold its next annual convention on July 26 and 27 at Madison, Wis.

Kentucky Mining Institute will hold its annual meeting and first-aid contest at Lexington, Ky., May 12 and 13. Secretary, Ivan P. Tashof, Lexington, Ky.

Byproduct Coke Producers' Association of America, formed in Chicago on Jan. 14 last, will hold its first annual meeting in Boston, Mass., on July 14, lasting probably two or three days.

International Railway Fuel Association will hold its eighth annual convention at the Hotel Sherman, Chicago, Ill., May 15-18. Secretary, J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy R.R., Chicago, Ill.

Illinois Mining Institute will hold a meeting May 25, 26 and 27 at Duquoin, Ill. Secretary, Martin Bolt, Springfield, Ill.

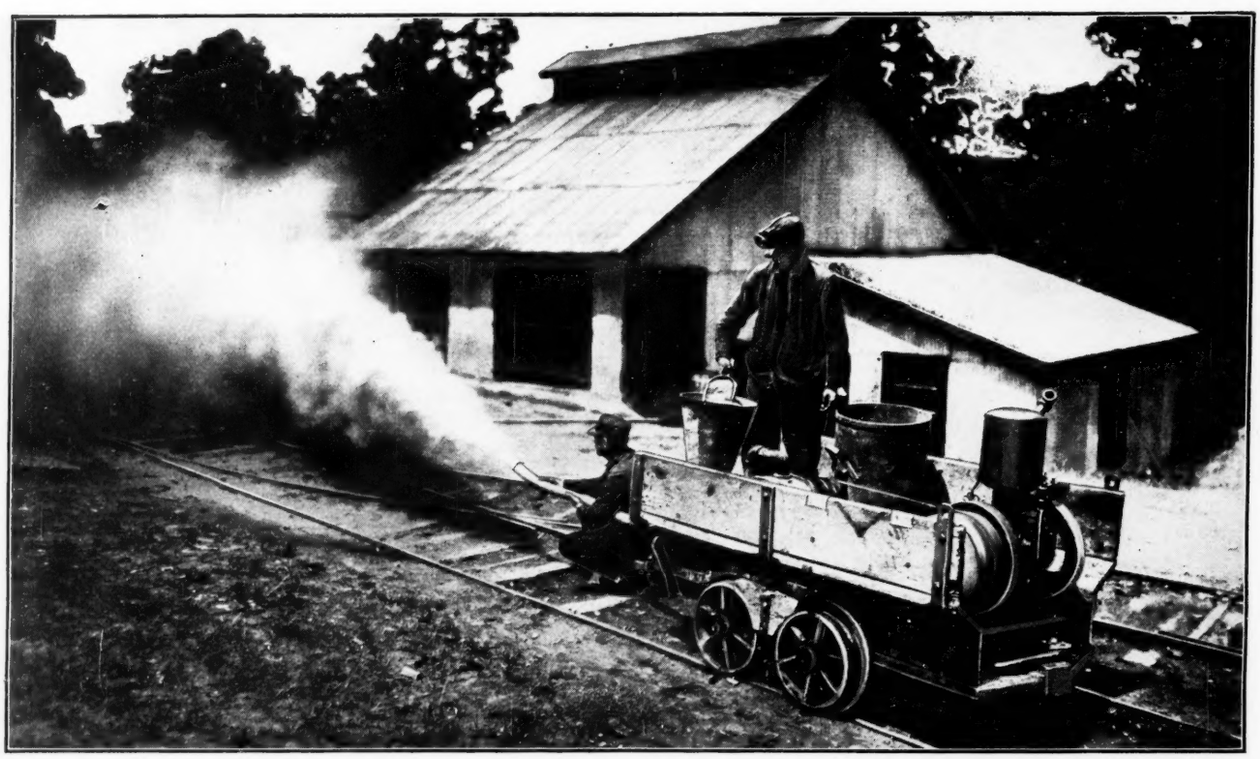
Engineers' Society of Western Pennsylvania. Monthly meeting third Tuesday; section meeting, first Tuesday. Secretary, Elmer K. Hiles, Pittsburgh, Penn.

West Virginia Coal Mining Institute will hold its summer meeting at Bluefield, W. Va., on June 1 and 2. Secretary, E. N. Zern, Morgantown, W. Va.

General Specifications for Rock-Dusting Machinery

The Federal Bureau of Mines has made a large number of explosion tests at the experimental mine at Experiment, Penn., to determine the efficiency of rock dust in preventing the initiation of mine explosions as well as in checking their propagation. The proportion of shale dust to coal dust required to prevent or check explosions has been determined for coal dust from many seams.

The rock-dust method seemed to have such advantages over watering methods when water is applied infrequently, in that more constant protection is afforded, that arrangements were made with a coal company in the Pittsburgh district to rock-dust a part of one of its mines and keep accurate account of the costs. Bureau engineers inspected the rock-dusted zones from time to time and took samples to insure that the zones were in safe condition.



THE ROCK-DUSTING MACHINE IN OPERATION

This work was continued for a year, the entries being redusted from time to time as the occasion required. The test has been so satisfactory that the dusting has been extended to three other mines, and conferences have been held with officials of other companies for the purpose of explaining results with the view to adopting the method. Considerable interest has also been shown in other parts of the country, particularly in Colorado, where rock-dusting has been carried on in the Delagua mine of the Victor-American Fuel Co. for more than four years. The probable wide adoption of this method of rendering coal dust inert, therefore, makes desirable the development of suitable machinery, both for preparing the dust and for its application.

The first rock dust that was used in the Pittsburgh district was pulverized limestone of such fineness that about 75 per cent. would pass through a 100-mesh sieve. This dust was satisfactory, but a coarser material would be easier and cheaper to prepare; therefore explosion tests were made in the experimental mine to determine the relative efficiency of fine and coarse dust. It was found that material prepared by grinding in a hammer crusher, equipped with a $\frac{1}{16}$-in. slotted screen, was only a little less efficient than the pulverized dust. It is believed that suitable equipment to secure such pulverization can be obtained at a low cost.

In rock-dusting a mine entry, the best way to apply the first coating is, under most conditions, to throw the dust on by hand, because a thicker and better-distributed coat is thus obtained. In time, coal dust settles on the rock dust, and redusting is desirable. This is best done by a rock-dusting machine, which blows into the air current a cloud of rock dust that settles in a mantle over the coal dust. The use of a machine decreases the cost and greatly increases the convenience of redusting. Such a machine as used at the experimental mine and similar to one in use at Delagua, Colo., is shown in operation in the accompanying photograph.

In order to stimulate interest in the development of suitable machinery for use in connection with the rock-dust method of rendering coal dust inert, the director of the Bureau of Mines is addressing the crusher and blower manufacturers as follows:

TO MANUFACTURERS OF CRUSHER APPARATUS

As the result of mine-explosion experiments at the experimental mine and explosion-prevention investigations in the field, the bureau is strongly recommending the use of finely crushed or pulverized rock dust, having no or a very small percentage of combustible matter, as a preventive for coal-mine explosions.

Nearly all mine explosions in bituminous coal mines, once initiated, are extended by the fine coal dust that is found on

the surface of most mine entries. This dust, when blown into a cloud, is explosive. If rock dust is thrown on the surfaces it covers the coal dust or becomes mixed with it, and if a sufficient amount is used, the cloud of dust blown from such surfaces in the event of an explosion is nonexplosive and quenches the flame. The more finely divided the dust is, the better it is for rock-dusting. Tests have indicated, however, that a dust all of which will pass through a $\frac{1}{16}$-in. slotted screen and having about 40 per cent. through a 100-mesh and 25 to 30 per cent. through a 200-mesh screen is satisfactory for the purpose. Further detailed information concerning the use of rock dust in mines can be obtained from Bureau of Mines Technical Paper 84, a copy of which I am sending under separate cover.

The bureau desires to inform you of this new field for crushing or pulverizing machinery. Information as to whether your company now has machines which will furnish material as fine or finer than that given, the output per hour, horsepower required and cost will be appreciated.

TO BLOWER MANUFACTURERS

It is desired to call your attention to the demand, which has arisen in connection with the work of prevention of coal-dust explosions in mines, for a machine designed to blow a cloud of rock dust. This will probably be of interest to you, as a positive blower is one of the essential parts of the apparatus.

One of the methods now strongly recommended by the Bureau of Mines for the prevention of coal-dust explosions is to coat the mine-entry surfaces with rock dust so that in the event of an explosion a thick rock-dust cloud will be formed and quench the flame. The first coating of rock dust is thrown on the mine-entry surfaces by hand. After a time some coal

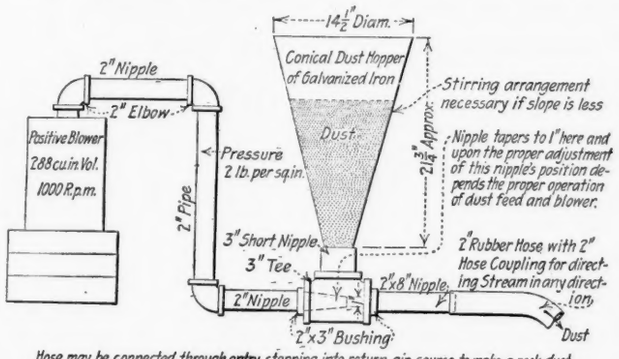

14½" Diam.
Conical Dust Hopper of Galvanized Iron
Stirring arrangement necessary if slope is less
2" Nipple
2" Elbow
Positive Blower 288 cu.in Vol. 1000 R.p.m.
Pressure 2 lb. per sq.in.
Dust
2" Approx.
Nipple tapers to 1" here and upon the proper adjustment of this nipple's position depends the proper operation of dust feed and blower.
2" Pipe
3" Short Nipple
3" Tee
2"x8" Nipple
2" Rubber Hose with 2" Hose Coupling for directing Stream in any direction
2" Nipple
2"x3" Bushing
Dust
Hose may be connected through entry stopping into return air course to make a rock-dust mantle over accumulation of fine coal dust.
When such entries have no track, frequently no attempt is made to treat coal dust.

DIAGRAM OF THE DUST INJECTOR

dust settles on the rock dust, and it becomes desirable to apply another coating of rock dust. This is probably most conveniently done by the use of the rock-dusting machine. It blows a thick cloud of dust into the air current, which carries it for long distances, the dust gradually settling out and forming a mantle over the coal-dust deposits.

The apparatus, as used at the experimental mine of the Bureau of Mines, consists of a small positive blower, the air from which passes through a 2-in. pipe to the injector chamber into which the rock dust is fed from a hopper; the air and dust, becoming mixed in this chamber, is blown through a hose into the atmosphere.

The attached blueprint shows an outline arrangement of the apparatus. The blower used has a volume of about 288 cu.in. and is run at about 1,000 r.p.m. The pressure in the outlet pipe when the machine is operating is about 2 lb. per sq.in.

The injector chamber should be carefully constructed. The 2-in. air inlet is reduced to a nozzle of 1-in. opening, and the nozzle should extend far enough into the chamber of the 3-in. tee so that the nozzle opening is below the outer edge of the dust-hopper opening. The dust then falls or is drawn forward into the air stream and is blown through the hose. A flexible hose is desirable for an outlet so that the air stream can be pointed in any direction; also this permits its connection to pipes through stoppings to direct the dust stream into aircourses or entries having no track and which ordinarily receive no treatment to render the coal dust present inert.

As the rock-dusting method of rendering coal dust inert is now being taken up actively, it is believed that there will be a considerable demand for such apparatus. Information as to whether your company could furnish such equipment and the approximate cost of the same would be appreciated.

Extracts from a Superintendent's Diary

Well, I have lived to see a live "coal baron," sure enough, beyond a doubt—I who have thrown the very name into the teeth of every newspaper reporter and socialist with whom I have locked horns during the past few years; and at that, he is the president of our company. He spent most of today in camp, accompanied by several of our directors. He was neither haughty and dictatorial nor arbitrary; neither was there any swagger or bluff about him; still he was a "baron" in every sense of the word, and never for a minute did anyone present seem to question his authority.

With him argument was out of the question. When he desired information, he asked for it; and from such information he formed his own conclusions. One could not imagine him asking for an opinion on any subject; he called for facts, and from the facts determined his course of action.

When he expressed an opinion on any subject, his very manner carried conviction; and there was an air of infallibility about him that was most impressive. A college professor might impress one the same way when saying, "These are the laws of gravitation." The statement that tells us that all men are created free and equal would have sounded like a merry jest if recalled while under the influence of this man's personality. His every action bespoke administrative capacity, and men would follow him to the end of the world quite as a matter of course.

Evidently someone had suggested to him that I was quite at sea in my opinions about the labor-union movement, because during the day he brought the conversation around several times to that subject, and each time took pains to address most of his remarks to me.

First, he asked me if I had ever encountered a labor leader who had any plan of action mapped out to guide his followers after they should obtain full control over all industry. "Remember, nothing short of full control will satisfy them," he remarked, "and they believe that they are justified in using any means to arrive at that end, even not excepting arson and murder."

Next, he wanted to know had I ever met a labor leader who seemed to realize that there are other interests besides labor vitally concerned with the administration of industry. This question started a long and interesting discussion that was participated in by all present. After the others said their say, the "baron" suggested that were it not for the autocratic control perfected by the employers, labor would soon back our farmers and the general public completely off the map. "And to think," he added, "of the insults that this same 'general public' heaps upon the employers at every opportunity.

"Take the matter of wages, for example—so long as increased wages do not affect the price of goods to the consumer the 'dear public' is 'agin' the operator and strong for the union; but let the operator attempt to suggest that any further increase in the price of the commodity will have to be met by the consumer, and the same 'dear public' insists upon an investigation by Congress to see whether its rights cannot be protected."

On parting, he said to me, "Mr. Thompson, your heart is on the right side, but you must watch or your sympathies will warp your judgment."

The Labor Situation

Anthracite Wage Conference

Despite the fact that the operators declared on Monday, Apr. 3, that their case on the readjustment of the machine rate was ended, nevertheless the matter was so persistent that it was continued on Tuesday, and when the meeting adjourned it was stated that no conclusion had been reached. In fact, the debate continued the next day and was not finally disposed of till Thursday morning. The operators' representatives suggested the providing of a minimum rate for machine mining, but the miners are desirous of submitting the matter to local boards for adjustment on what they regard as a more equitable basis.

The outcome of the negotiations on the other demands depends in a degree on the conclusion arrived at regarding the demand on machine mining. As it is the first time that machine mining has figured in the agreement between the anthracite operators and miners, both sides are going slowly. It was estimated that last year about 1,500,000 tons of coal was produced by machines in the anthracite region.

Why Machine-Mining Scale Merits Much Debate

The scale committee of district No. 1 held a meeting, presided over by John Dempsey, president, at the Continental Hotel on Tuesday, Apr. 4. This is the only anthracite district affected by the machine-mining scale, because only in this, the Northern coalfield, lying between Shickshinny and Forest City and including Wilkes-Barre and Scranton, are the measures flat enough to permit of mechanical undercutting.

It is somewhat generally understood that the operators will extend the use of mining machines largely if a scale that will make that course profitable is obtained. The issue therefore is more important than the small tonnage involved would lead an observer to suppose. Nothing official could be learned regarding the meeting at the Continental Hotel at which the miners discussed their desires in the matter of machine-mining rates, the intimation given being merely that the rates had been discussed.

Owing to the serious illness of his mother, John P. White has not attended the sessions of the wage conferences since Tuesday, April 4. Mr. White left for his mother's home at Albia, Iowa, on Wednesday, Apr. 5, in response to telegrams stating that his mother was very ill.

Will Not Decide Issues Till White Returns

The conferences have continued however. On Apr. 6 demand No. 5, asking for a more speedy and satisfactory method of adjusting disputes, was discussed. The debate extended into the following day, when demand No. 6, asking that no contract miner be permitted more than one working place, was considered. No session was held on Saturday, Apr. 8.

When the sessions of the subcommittee were resumed on Monday, Apr. 10, at the Union League Club, Mr. White was not present, being still at the bedside of his mother.

Demand No. 8, wherein the mine workers ask that whenever coal shall be mined on a car basis it shall be weighed and paid for on a mine-run basis of 2,240 lb. to the ton, was before the committee. Much time was spent in examining rate sheets and payrolls in an effort to reach an understanding.

It is not expected that any agreement will be attempted until after the return of Mr. White, which is scheduled for this morning, Apr. 15, provided that the venerable patient, now 87 years old, shows no new unfavorable symptoms.

At the conference on Tuesday, Apr. 11, the selling price of mine supplies was considered. The miners ask that the prices be fixed on a more uniform and equitable basis, and the session was devoted to an effort to reconcile the request with the present high prices of powder and other mining supplies. On Wednesday, Apr. 12, demand No. 6, relating to the restriction of each miner to one working place was reconsidered by the conference.

It has been learned that much progress has been made by the committeemen toward clearing up some of the points under discussion, though as stated nothing definite will be done until after the return of President White from his home in Iowa. One of the matters thoroughly discussed, as the perusal of this report and that of last week will show, is that of machine-mining rates. The latest reports are that it rapidly approaches a settlement. It is understood that the miners have made a proposition to the operators' representatives in which it is provided that the miners shall not dispute the right of the operators to install mining machines, but that when such machines are installed the company officials shall notify the mine grievance committee. The committee shall then confer with the mine officials and negotiate an individual agreement covering the conditions under which the machines shall operate, but that in no instance shall the contract price amount to less than the day-wage rate agreed upon.

Philadelphia Joint Conference

When on Tuesday, Apr. 4, the miners and operators of the central Pennsylvania field met again in Philadelphia to discuss the scale after an adjournment since Friday, Mar. 31, there were some hopes that the operators would make some concessions and progress would be made toward a settlement. But of that there was no evidence, the two parties appearing to be as far apart as ever.

But on Friday, Apr. 7, after the subscale committee had reported to the conference committee that it could come to no agreement, the operators offered a new scale, such as had been long anticipated. It runs as follows:

AGREEMENT OFFERED BY CENTRAL PENNSYLVANIA OPERATORS TO PHILADELPHIA CONFERENCE

We offer to increase wages on the following basis: (1) Pick mining per gross ton, 3c. advance. (2) Machine mining per gross ton (machine mining to cover cutting, scraping and loading on a tonnage basis), 3c. advance. (3) Machine mining where done by day, hour, task or ton, or any combination thereof: Loading, 81 per cent. of 3c. per gross ton advance; cutters and scrapers, 5 per cent. advance over existing prices; provided that the total advance per gross ton shall in no event exceed 3c. (4) Net ton advance to be the equivalent of the foregoing gross ton advance. (5) All day labor to be advanced 5 per cent. over existing prices. (6) All yardage rates and deadwork to be advanced 5 per cent., discarding fractions of a cent per yard or per day. (7) All other provisions of the 1914 scale agreement to remain unchanged and to be renewed in their entirety. (8) Scale agreement to be for a period of two years from Apr. 1, 1916.

This new offer the operators contend is similar to the "McAlpin" agreement signed in New York for the Illinois, Indiana, Ohio and western Pennsylvania districts, but this is disputed by the miners. However, the concession offered by the operators has made everyone hopeful of a happy issue.

On Monday, Apr. 10, when the miners' representatives and those of the operators met at the Bellevue-Stratford Hotel, it was stated that prospects for an early agreement appeared good.

Small Committee Will Now Try To Write Scale

The demands of the mine workers and the new proposal of the operators are now being considered by a committee, consisting of B. M. Clark and Rembrandt Peale for the operators and District President James Purcell and Secretary Charles O'Neill of the United Mine Workers.

On Monday, Apr. 3, the Berwind-White Coal Mining Co. posted notices at its Clearfield collieries advancing the wages of day laborers 5 per cent., and also increasing the rates of machine and pick mining 3 per cent. The mines of the company are not unionized. If the "3 per cent." advance is correctly quoted, the Berwind-White Coal Mining Co. will put the union operators at a disadvantage, for the latter are giving an increase of 3c. and 5.39c. per ton, which is from 5½ to 12 per cent.

Reports are in circulation that the scale introduced by the Berwind-White Coal Mining Co. is not satisfactory to the men and that they will strike as a result. This has been denied at the company's offices at Windber. It has also been reported that the men are going to strike at the Lochrie mines, but John Lochrie, superintendent and general manager, denied that his men meditated a suspension. The Lochrie miners were granted the same increase as the Berwind-White men. The striking miners at the Valley Smokeless Coal Co. failed to reach an agreement and have not yet returned to work. Those striking against the scale at the Morrellville Coal Co.'s works have presented their demands to the operators and expect an early settlement. It was denied at the Smokeless Coal Co. office that a strike had been declared by the miners at the big Ferndale plant. It was also denied that a strike was threatened at the plant of the Loyal Hanna Coal Co., at Cairnbrook.

Suspension in the Anthracite Region Not Expected

Operations at several of the mines in the anthracite region were either suspended entirely or curtailed on Monday, Apr. 3, but both operators' and miners' representatives attending the wage conference in New York City denied that the decreased output was due to the failure of the members of the United Mine Workers of America to obey the instructions of International President White and the district presidents which required them to remain at work pending the result of the negotiations.

Many of the mine workers, it was said, were idle because of the celebration of the 8-hr. day on the previous Saturday, the men not having recovered from the effects of the festivities. Perhaps the idleness was longest at the Moosic Mountain colliery, at Marshwood, which lies on the eastern side of the northern field, not far from Scranton. No. 1 of the Mount Jessup Coal Co., Ltd., near Peckville, Penn., and in the same part of the same field, had a suspension of almost equally long duration. But generally speaking, the men have resisted the action of the Industrial Workers of the World and have followed the instructions of the international scale committee. At Pottsville, the I. W. W. was quite active, but its plotting was entirely without result.

Miners' Press Agent Expresses Satisfaction

However, the officers of the union were uneasy and feared the men might demonstrate to the satisfaction of the public that the mine workers would not follow the pledges of the union and thus would vindicate the operators of the anthracite region in their refusal to recognize the organization. Because of this uneasiness K. C. Adams, who is the press agent for the miners, sent out a statement regarding the situation showing how favorably it contrasted with 1912 and justifying the mine workers' officials in patiently continuing negotiations. No one can doubt that Mr. Adams proves his main contention. He declares:

The present is the first real wage conference ever held between the anthracite miners and their employees. In the years gone by it was the custom of the miners, through their scale committee, to present their demands at a general meeting, solicited by them, and after they had delivered oral arguments in support of those demands, to take their seats and listen to a masterfully worded and lengthy brief of flat rejection read by the spokesman of the operators.

Such was the procedure in 1906, 1909 and 1912. The operators' organization led by the late George Baer, of the Philadelphia & Reading Coal and Iron Co., was all-powerful. They defied the mine workers and refused to grant any concessions whatsoever, with the result that from the day of the anthracite strike commission's award in 1903, the anthracite mine workers did not receive a single increase in wages or improved working conditions by reason of any agreement until 1912.

Reason Why a Suspension Occurred in 1912

He goes on to say that in 1912 a similar flat refusal was made to the miners' demands and that a strike on Apr. 1 was the inevitable result. He adds:

Following the consummation of the 1912 bituminous contract, President White asked the anthracite operators to reconsider their action in the interest of the public welfare. The operators in the meantime had felt the pulse of the people. Their diagnosis revealed public sentiment against them. They accepted White's proposal. The conference suggested convened Apr. 10 and continued in session until Apr. 24, when the report of the subcommittee was presented to the conference as a whole and adopted.

Thus in 1912, from the date of presenting the demands, which was Feb. 27, 67 days passed before the subcommittee reached an agreement. Following the tentative contract a tri-district convention was called to meet in Wilkes-Barre on May 14. The contract was ratified on May 18, but the men did not return to work until May 20, 26 days after the subcommittee had agreed. The total time required to negotiate and ratify the agreement of 1912 was therefore 93 days, or 3 months.

And this long period intervened, too, when the miners were idle [or rather when the miners hurried the progress of negotiations at great cost by remaining idle from Apr. 1 onward.—Editor]. Comparing the time consumed in negotiating the 1912 contract with the present, the progress made this year is surprising. Instead of creating impatience, the situation should be extremely gratifying to anthracite mine workers, even without taking into consideration the possibilities of the outcome, which are so promising in comparison with the almost hopeless situation in 1912, when the union was weak in numbers.

Spent Only 19 Days in Actual Conference

The present conference met on Feb. 21. The demands were presented and adjournment taken until Feb. 28 to permit President White to conclude negotiations with the bituminous operators. Bituminous differences could not be rushed any faster than conciliation and argument would permit. As a result the subcommittee did not reach an agreement till Mar. 8.

On the morning of Mar. 9 the committee as a whole ratified the bituminous agreement, and President White, with the district presidents of the anthracite miners, met the anthracite operators the same afternoon. Not a single day's delay occurred between the adjournment of the bituminous and the convening of the anthracite conference. Surely no one can justify complaint against such an efficient arrangement or find cause to become impatient.

The calendar of working days of the subcommittee on the anthracite wage scale is as follows: Mar. 9, 10, 11, 13, 14, 15, 21, 22, 23, 24, 27, 28, 29 and 30; Apr. 3, 4, 5, 6 and 7—a total of 19 actual conference days.

What have been the causes for adjournment? Have they been justified? Let us consider. The adjournment of Mar. 15 to 22 was arranged to permit President White and three district presidents to attend the meeting of the international policy committee at Pittsburgh, Penn., called for the purpose of ratifying the bituminous contract. The adjournment of Mar. 30 to Apr. 3 was arranged to permit S. D. Warriner to attend a court trial at Trenton, N. J., Mar. 31, and President White to speak at Scranton and Wilkes-Barre at celebrations of the 8-hr. day achievement on Apr. 1. Calmly reviewing the work of the conferees, adjournments have not been so numerous as the impatient mind of the very few and "the anything that will make a story, hit or miss" newspaper accounts would lead one to believe.

Only 47 Working and Other Days from Start

Only two adjournments have occurred since the real work began, and neither could possibly have been avoided. Forty-seven days have elapsed since the presentation of the demands. Compare this number against the 1912 record of 67 days, and the committee still has to its credit 20 days more before it exceeds what some might be inclined comparatively to term the time limit. Only 19 of the 47 days have been utilized as working days; that is, days when the committeemen discussed the demands and by argument sought to reach a solution of the big problems confronting them.

It appears that the dissension has been made a "feature story" in some newspapers and that the miners are not so dissatisfied as certain newspaper men who are eager for display headlines and columns wetted with the reader's sobs. At Shenandoah the miners passed a vote of confidence in their leaders and condemned the newspapers for their tactics.

It is probable some feeling will be aroused by the "slow time" the mines have just recently been working. An attempt will be made to urge that they are closed as a lockout provision instead of as an outcome of a sorely glutted spring market, unrelieved as it is this year by the regular spring discount. As the wage will be retroactive when granted, the operators doubtless want to save the discount to meet the higher cost.

The Cranberry colliery of A. Pardee & Co., located in the Minersville section, was idle on account of a dispute regarding the size of cars, and the mine was shut down by the management. The miners contend this was a lockout in violation of the award of the strike commission and contrary to the present agreement which requires the operators to continue work pending negotiations for a new contract.

McAlpin Agreement Approved

The wage agreement between the miners and operators of western Pennsylvania, Ohio, Illinois and Indiana made at the McAlpin Hotel, New York City, has been ratified by the miners in referendum, 84,498½ members being in favor of it and 42,820 being opposed to it.

William Green, the international secretary-treasurer of the union, states that "in the Indiana district, where the strongest opposition was manifested, a larger proportionate vote was cast in favor of the agreement than in any other state."

As shown by the referendum vote, the McAlpin agreement was satisfactory to most of the soft-coal miners of Illinois. The vote in favor of the agreement was 30,153; that against it was only 18,205. The contract was not acceptable to many of the miners in the fifth and ninth districts, because it does not adjust the differential of 4c. between the wage scale in those districts and that in force in southern Illinois. The differential is in favor of the men of the fifth and ninth districts, but they are convinced that it works to their disadvantage because it prevents the operators of those regions from competing with the southern Illinois operators, and as consequence the miners of the fifth and ninth districts have little work. They would rather have their wages equalized downward and get more operating days.

West Virginia a Coal Producer in 3616 A. D.—The coal in West Virginia is so nearly inexhaustible that the present generation, at least, need feel no alarm at the possibility of its depletion. The coal deposits of the state are estimated as capable of affording a yield of 174,044,900,000 tons. At the present time the production runs about 70,000,000 tons per year. But even if this average should be increased to 100,000,000 tons, or a matter of about 30 per cent., there is enough coal in the mountains to last seventeen centuries, providing that care is taken not to waste the deposits and that the demand does not increase above the figure suggested. But before 3616 A. D. we may decide we have no need for the energy in coal.

New Apparatus and Equipment

Imperial Type Air Compressor

Because of the wider use of high-pressure and superheated steam there has been developed a balanced-piston steam-valve gear that has been incorporated in the design of the standard "Imperial" duplex air compressor.

The cutoff valves are right and left-hand threaded to a cutoff valve stem. Steam is admitted through the center of the valve (Fig. 2) to the cylinder and is exhausted

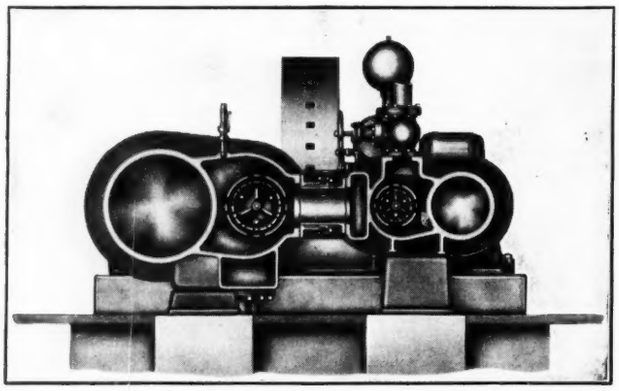


FIG. 1 SHOWING STEAM VALVES AND RECEIVER

around the ends of the valve. The valve-chest covers and steam packings are exposed to exhaust pressure only.

The machine is built with a steam receiver between the high and the low-pressure steam chests, Fig. 1. A special expansion joint guards against destroying the cylinder alignment.

The governor is a speed and pressure regulator which varies the cutoff by automatically rotating the cutoff-valve stem. It is essentially a chain-driven rotary oil pump

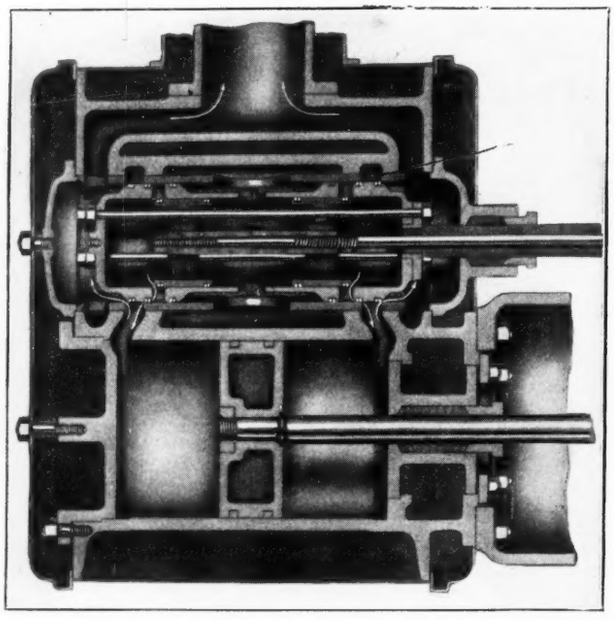


FIG. 2. SECTION THROUGH HIGH-PRESSURE CYLINDER

acting against a weighted plunger. The oil pressure maintained by this pump on the plunger varies with the speed of the compressor and changes the point of cutoff in the steam cylinders.

The other features of this new compressor, called by the maker "Imperial" Type XPV, are inclosed main frames containing the reciprocating parts, automatic lubrication by the bath system and water-jacketed air-compressing cylinders.

This compressor, built by the Ingersoll Rand Co., 11 Broadway, New York City, is made in capacities from 608 to 3,620 cu.ft. per min. and for discharge-air pressures from 10 to 110 lb. per sq.in.

Fuel-Oil Driven Compressors

To produce air compressors with lower operating and first cost than any previously known—machines well suited to rough, heavy duty under all sorts of abnormal conditions, but with all the operating qualities of economy and simplicity necessary to high-grade stationary performance—has been the ideal of the engineers of the Chicago Pneumatic Tool Co., Chicago, in the development of the Class N-SO fuel-oil driven compressors.

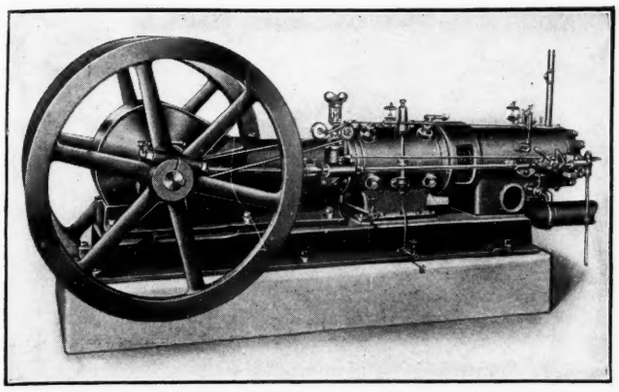
The importance of these compressors lies in the fact that they supply a demand not met by other machines. This is attributable to the fact that they operate on the lowest grades of fuel distillates.

The compressors are guaranteed to run on any mineral oil of 28° Baumé scale or lighter, containing not over 1 per cent. of sulphur. There are a number of oils well below this limit on which they will operate satisfactorily, but this depends upon the characteristics of the particular oil, such as its asphaltum content, freedom from sand, etc., so that a general guarantee cannot be given, though recommendations for heavy oils can and will be made.

Most of the common crude oils, fuel oils and residuums are naturally included in the guarantee. A few of the well-known oils particularly suited to the operation of the compressors are star oil, Diesel, calol, stove oil, solar oil, gas oil, kerosene and all of the distillates between kerosene and lubricating oil.

A number of these fuels are obtainable for 3c. per gallon, so that these machines are warranted to compress air to 100 lb. pressure at a cost not exceeding 56c. per day of nine hours for each 100 cu.ft. per minute of free air delivered to the receiver. These figures are so low as to seem almost incredible. The facts, however, show that there are dozens of machines in service with daily records of fuel consumption that bring their costs of operation well under the amount stated. The immediate effect of these performances has been to create a heavy demand for these machines and it seems certain that they will open up entirely new fields for the application of compressed air.

These compressors are of the horizontal straight-line single-stage type, with compressing cylinder bolted to the main frames and closely connected in tandem to the



THE FUEL-OIL DRIVEN COMPRESSOR

power ends. The propulsive cylinders are of the valveless two-cycle low-compression design. Ignition is produced by a patented positive-acting hot-plate system that eliminates all electric apparatus such as magnets, timers, mixers and spark plugs.

Just as in the Diesel engine, combustion takes place at the end of the compression stroke. The importance of this feature of design is immediately apparent. Air only is compressed in the cylinder, and the combustion is so complete by the time the exhaust port is opened that the fuel loss is negligible. This result is attained through the medium of a small oil pump which injects the fuel against the hot plate on the piston as it approaches the end of the compression stroke. Increased economy is obtained by the use of water with the fuel oil. The quantity of both oil and water admitted to the combustion chamber is controlled by a fly-ball governor.

The outstanding features of the compressing cylinders are of course the patented "Simplate" flat-disk air inlet and discharge valves. These are the valves which have been credited with making possible the highest compressor speeds and efficiencies known. They are the only valves obtainable in American-made compressors of concentric plate construction. They are guaranteed for three years, and the company's records show that with 20,000 valves in constant use there has not been a serious complaint to adjust or cause indicated for any appreciable modification in design.

The compressors are made in both single and double machines. Single compressors come in six standard strokes—8, 10, 12, 14, 18 and 21 in. The smaller sizes may be tank mounted and the larger types set on skids, so that their use is not confined to stationary requirements.

The adaptability of these machines to severe conditions renders them particularly attractive to mines and contractors, but they are equally desirable for railroad and industrial shops, for pumping oil and water by various systems and for use wherever cheap compressed air can be utilized.

Oil-Burning Preheating Furnace

The No. 3 Leyner oil-burning furnace, which is used extensively for heating drill steel, is now made with a preheating chamber which greatly increases the capacity of the furnace. This preheater is a section which fits between the body and cover of the furnace of the old design. It is therefore a simple matter to attach this section to an old furnace by changing a few bolts. Refering to the illustration, it will be seen that the lower chamber is used for the final heating and the upper one for preheating.

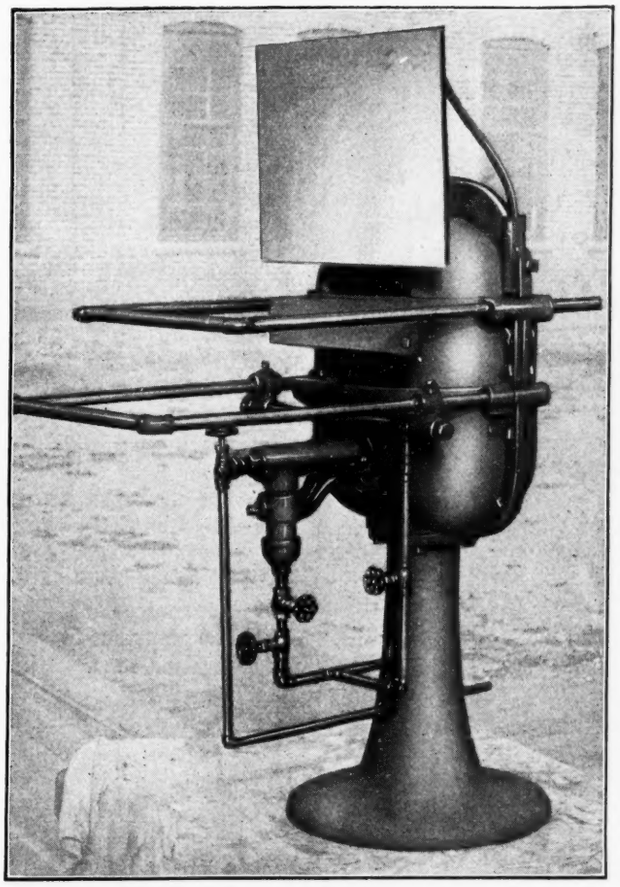
It is claimed that by the addition of the preheating feature the space for heating is doubled, the heating capacity of the furnace is increased about 50 per cent. and the efficiency of the furnace is increased correspondingly.

The type of burner now supplied with this furnace is suitable for either high- or low-pressure air. The air has merely to be throttled when high pressures are employed; and when this is done, the burner is as efficient as those designed especially for high pressures, but the noise common to such burners is eliminated.

This furnace burns petroleum or any of its oils, such as gasoline, kerosene, distillate, etc. Oil heating has many advantages. The steel cannot be injured by absorbing undesirable elements such as sulphur, phosphorus, or other impurities which are present in nearly all coals, nor from unequal heating, as the steel is heated in a flame which imparts a uniform temperature. The piece being heated is in full view of the operator at all times.

The floor space occupied by the No. 3 furnace is 3x4 ft. No foundation is required, installation being complete when air- and oil-supply pipes are connected.

The absence of smoke, soot, dust, ashes and cinders is a great convenience, which particularly appreciated in underground mine installations as well as in plants installed in buildings. The manufacturer of this furnace is the Ingersoll-Rand Co., 11 Broadway, New York City.



IMPROVED OIL-BURNING FURNACE

Editorials

Conservation of Product or of Raw Material?

Sir Richard Redmayne's recent remarks before the British Institute of Mining Engineers on the need that care be taken of our mined mineral resources as well as of those which are unmined are well conceived, though not new. The coal in the ground is merely coal; mined, it is coal plus labor.

What right then have the pharisees who love to belittle our industry to be always gloatingly pointing to our waste of coal—a mere mote in the industrial eye—when, owing to their own negligence, there is a greater waste of the product which involves the loss of the labor also by which it was extracted and the energy and effort by which it was brought to the consuming plant? Worse yet, the consumers most prodigally waste steam, another outcome of coal utilization, which product has been created only by a further expenditure of labor.

The public delights in the flaying of an individual industry for the wastage which is peculiar to it. But the waste of a product like coal is common to all the trades and industries, and so the public seems proud to see that it is using, let us rather say wasting, so much of the mineral. "Greatest country on earth," we assert. "Use more coal per capita than any people on the globe." Perhaps it would be better to know something about the brake horsepower delivered at the machine per ton of coal used before we start to crow so jubilantly.

It is true that the complete use of every scrap of energy in coal is impossible with our present modes of conversion of chemical into physical energy, but even despite that fact, the study of such economies may be fittingly urged on a public that now asks that every item of mineral wealth be recovered regardless of the physical difficulties. But even if new methods for securing the whole potentiality of coal can never be discovered, certainly the public by using known precautions could save at least half of what is now wasted and perhaps a higher proportion.

It is doubtful if today more than 3 per cent. of the energy of the coal used in steam raising actually reaches the work for which the coal is consumed. If that be true, how ludicrous are those vociferous manufacturers who waste 97 per cent. of the heat values of the mined fuel and condemn the mine operator who is leaving from 5 to 50 per cent. of the unmined fuel in the hill.

The estimate of the ultimate power outcome of the heat in coal is based on the figures prepared by Henry Kreisinger regarding a Southern cotton mill, which are quoted in a bulletin entitled "Hand-Firing Soft Coal Under Power-Plant Boilers," published by the United States Bureau of Mines. He places the loss in ashes at 3 per cent., in dry chimney gases at 26 per cent., in moisture at 4 per cent., in incomplete combustion at 5 per cent., in radiation at 5 per cent., in auxiliaries at 4 per cent., in condenser water at 43 per cent., in steam-engine friction at 1 per cent., in friction of shafting and transmission at 3 per cent., and in friction of machinery also at 3 per cent. Thus a coal having 14,000 B.t.u. provides only 420 units of productive heat energy.

Sometimes reforms should not start at the root, but in the branches, and waste prevention may less fittingly start underground than on the surface where the coal is misused.

German Miner's Daily Wage

We have been told so often by laboring men that Germany is the paradise of the worker that sometimes we need to get a better grasp of the facts by studying the available figures. As *Coal Age* has pointed out before, if we charged Teutonic prices for coal and paid the wage the German miner receives, we could turn the approaches of a mine into a semblance of the Garden of Eden in its palmiest days, especially if the workingman would coöperate just as we would have him in the carrying out of our stereotyped plans.

The monthly review of the Bureau of Labor Statistics publishes a report, printed elsewhere in this issue, which shows that the average wage for boys in the German mines of various districts runs between 33½c. to 40c. per day; for women, between 34c. and 43c.; for miners, between 98c. and $1.59; for other underground workers, between 87c. and $1.22, and for surfacemen, between 80c. and $1.11.

Now, a large degree of paternalism is needed with such wages. Saving is almost impossible, and the employer must be ready to shield such a worker from all the difficulties which upset the equilibrium of life—sickness, idleness, childbirth, old age and death. He can well afford to do it.

Our miners claim they cannot save. Let them study the predicament of the German miner with his 98c. a day in war times, with almost panic prices. In central Pennsylvania the miners are demanding $2.98 for 8 hr. where they are paid by the day. At that rate the Lower Silesia miner works a week for what a central Pennsylvanian regards as pay for two days.

The American operator who would ask his men to accept the German scale for the German's privileges would find marvelously few workingmen who would readily comply with his suggestion.

Byproduct Ovens Displace All Other and Older Types

There has been a wonderful improvement in the old-fashioned coke oven in the last few years. Had it not been so, no new ones would have been constructed. The present Belgian oven is a model from a mechanical point of view, so that now 13 men will run 100 ovens. The cost of producing coke has been reduced to a minimum, and even the gas of beehive ovens is now burned under boilers and furnishes power for the plant.

And still it is hard to meet competition, for mechanical perfection is not all that is needed. It is necessary to

save the byproducts and to avoid burning up about 16 per cent. of the coal to maintain the coking process. Incidentally by the saving of carbon the ash percentage of the coke is decreased and consequently the value of the product enhanced.

It is reported that the United States Steel Corporation is about to build a large plant at Clairton, Penn., one and a half miles in length and a half-mile wide, in which 25,000 tons of coal will be daily converted into coke and from which it is expected 140,000,000 cu.ft. of gas will be pumped daily into the Homestead, Braddock and Duquesne mills. Thirty cars of tar and ten tanks of benzol will be shipped every 24 hr. There will be 640 ovens at first, and eventually 1,300 will be installed.

There is little question but that this will stop any further construction of beehive and Belgian ovens. All the mechanical contrivances utilized in the Belgian oven plants can be modified so as to be available for these other installations. The fact that the byproduct oven makes more coke means that it gives less recoverable heat for manufacturing purposes than is given when a larger part of the coal is burned away, and therefore makes it possible to install with minimum loss of power when the demand for gas does not exceed what is needed for the local mining plants. So there is no reason why it should not be installed in the heart of West Virginia, away from soaking pits and open-hearth furnaces.

The coking of coal in a byproduct oven will produce gas giving 1,500 B.t.u. per lb. of coal. It may develop as much as 75 per cent. of the coal as coke. A ton of coal will produce 1 gal. of benzene, ⅓ gal. of toluene, 1 lb. of cyanogen, ⅓ lb. of carbolic acid, ½ lb. of cresylic acid, ⅛ lb. of anthracene and 240 lb. of sulphate of ammonia. From the cyanogen can be obtained about 2 lb. of prussian blue or 3 lb. of yellow prussiate of potash, or 2 lb. of sodium cyanide. It is wrong to let these products be wasted, especially seeing the need of the country for these things now that war has closed the regular markets and made our dependance on alien sources inconveniently apparent.

Pennsylvania Coal Investigators Begin Work

Following the initial meeting of the commission appointed to investigate the prices of coal in Pennsylvania, Judge Gawthrop, chairman of the commission, is reported to have said: "If we find that the coal operators unlawfully raised the prices, we will make them pay back to the wholesalers the money they obtained. The wholesalers will likewise have to return their unlawful increase to the retailers, and the retailers to the consumers." Assuming Judge Gawthrop to have been correctly quoted, a lack of knowledge is divulged that must be viewed with much concern in coal circles. In the first place, the operators are already reimbursing purchasers for the amount of the tax, while in the second place it is a well-known fact that the wholesalers referred to have long since been eliminated as a factor in the coal trade, by far the greater proportion of the sales in Pennsylvania being made direct to the retail dealer.

Should the commission endeavor to force the retailers to return alleged increases to consumers, it will find itself facing a monumental task. Undoubtedly there were some dealers who increased their prices, but on the other hand there were many who did not. No sweeping general decision would therefore be applicable to all cases, and it would be necessary to conduct separate investigations of each individual dealer in order to arrive at an equable decision. Furthermore, even in those cases where retailers did advance prices, the commission would not in every case be justified in ascribing this to the new state tax, since it is a well-known fact that the higher cost of commodities of all kinds, not to mention the constantly advancing wage scale, has frequently made this essential.

It is understood that the commission will start work immediately, holding its sessions in the principal cities of the state, and there is keen interest noted among all concerned. On the one hand the consumer, imbued with the feeling that he has been the victim of a blood-sucking octopus for years, confidently expects relief, while on the other hand the retailer, who for years has been chafing under what he regards as unjust accusations, rejoices in the fact that he will at last receive redress.

How Russia Has Suffered from Shortage of Coal

The United States is not the only country with its coal resources so near its exterior lines that they are subject to seizure by the enemy. Germany is a striking example of such vulnerability, but by reason of its preparedness and forceful aggression, its coalfields in the present war have remained in its possession; and some, like those of the Ruhr and Aachen districts, have not even been approached by an enemy.

But Russia had one of its best fields, the Dombrova, close to the frontier line. In fact, it was the extension of a region better known for its developments in the country of the enemy—the Upper Silesian coalfield. The Russians must always have regarded this as in precarious possession, and after the war commenced, it was not long that they were able to hold it.

The loss of that coalfield and the discontinuance of import coal reduced the available supply from 47 millions to 31 millions of tons, despite all the effort made to meet the emergency. Thus Russia has been obliged to meet the unparalleled demands of the war with a two-thirds supply of coal.

Its Asiatic dependency and the Azof or Donetz field have come valiantly to the assistance of Russia, but so far not in a measure which will relieve the shortage. Russia is still as unfortunate as the United States would be with the Pennsylvania and Ohio bituminous fields shut down, providing the other fields could not produce an increased tonnage to countervail their loss.

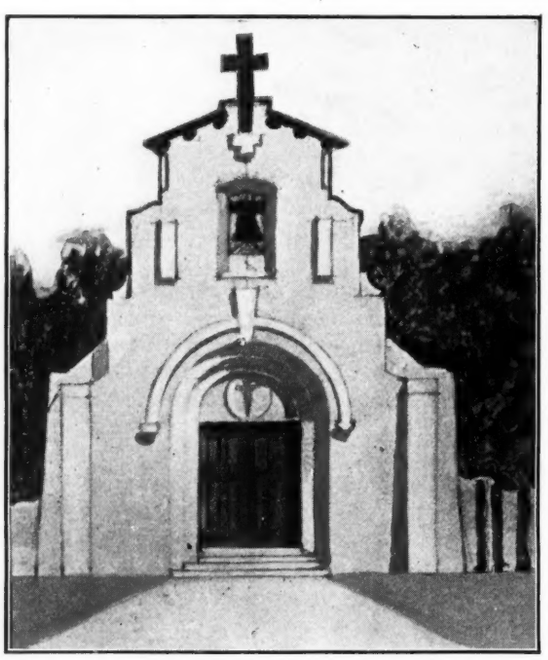
As time passes the Russian resources in Siberia and the Donetz basin will be brought into better operative condition, and before the war is over the loss of tonnage may be more than met. The other fields are as safe as those in our own Rocky Mountains from foreign invasion. The Donetz field could hardly suffer from an enemy which is not master of the seas, so far is it removed from the frontier. Perhaps it would be better were it a little nearer the front, where its output could be more readily placed at the disposal of the fighting units.

Sociological Department

J. D. Rockefeller, Jr., Builds Catholic Churches

John D. Rockefeller, Jr., himself a Baptist, has agreed to contribute toward the erection of a Roman Catholic Church at Berwind, Colo., one of the coal towns of the Colorado Fuel and Iron Co. Mr. Rockefeller has also expressed a willingness to coöperate in building a Protestant or a Catholic church, or both, in every Colorado Fuel and Iron camp where the need of and desire therefor have been manifested by a sufficient number of the residents of the community to assure adequate support and permanence of worship.

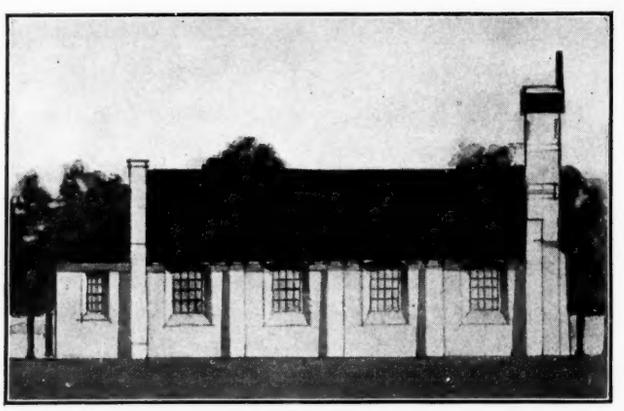
In agreeing to contribute toward the erection of churches, Mr. Rockefeller has stipulated that neither he himself nor the company shall assume any responsibility for or control over them. "Any church work to be successful must be organized and controlled by the community in which it is situated," Mr. Rockefeller wrote to the officers of the company, in connection with his first gift for this purpose.



FRONT OF NEW CHURCH AT PRIMERO, COLO.

The Colorado Fuel and Iron Co. will lease at a nominal rental to the congregation at Berwind a site on company property for the new church which is to be erected there. The leased tract is to be under the sole control of the Roman Catholic Church so long as it is used for church purposes.

Much care has been devoted to the design of the new Roman Catholic church to be erected at Berwind, for it is expected to serve as a type for church buildings in other camps. The plan evolved was that of a Spanish mission type of building, constructed of cement blocks and covered with white stucco. It is contemplated that in every mining camp the church buildings shall be the dominating structures, both in location and architectural treatment. It is believed that the influence for good exerted by the churches will be enhanced if the structures are both dignified and simple. For the Protestant churches there will be selected a different design from that adopted for the Catholic church edifices, though one equally pleasing and appropriate.

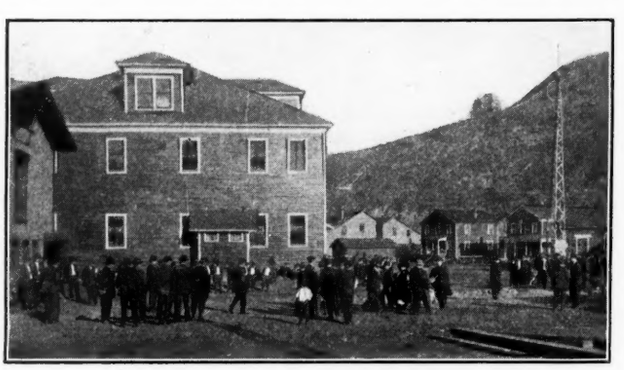


SIDE VIEW OF PRIMERO CHURCH

In carrying out the scheme of coöperation outlined in the industrial rèpresentation plan adopted by the Colorado Fuel and Iron Co. and its employees after Mr. Rockefeller's visit to Colorado last fall, the company is providing additional bath and club houses. Mr. Rockefeller personally agreed to erect an emergency hospital at the coal town at Primero, Colo., and at the iron-mining village at Sunrise, Wyo.

Raleigh Mining Institute

After climbing laboriously up a narrow but beautiful valley, so straitened that there is hardly room for the houses which line it, the train from Quinnimont on the Chesapeake & Ohio Ry. reaches Raleigh, W. Va., and enters a more gently rolling country which marks



VIRGINIA THEATER OF RALEIGH MINING INSTITUTE

MEMBERS OF THE RALEIGH MINING INSTITUTE, WHO HAVE MADE THEIR ASSOCIATION A CENTER OF PROGRESS

the heart of Raleigh County. There is elbow room in Raleigh, which cannot be said of some of the points just passed.

Now, Raleigh has been noted also for some time for the mental elbow room, which is of as great importance as the physical. Raleigh has a mining institute of about 200 members only a few of whom ranged themselves in front of the building when the accompanying picture was taken.

The mining institute manages the building shown in the other illustration. It is known as the Virginian Theater. It was built by the Raleigh Coal and Coke Co., but is in charge of the employees, and a sum of money is to be set aside from the proceeds regularly as payment of the construction cost. The building was opened on Dec. 11 of last year, the dedication being attended by about 1,000 people. It was constructed with the intention of adding a balcony later in which 700 persons can be seated.

Raleigh has three bands—a 16-piece American white organization, a 20-piece band of colored men and the 16-piece Philharmonic Hungarian band. All the men in these bands are residents of Raleigh and are miners or other employees of the Raleigh Coal and Coke Co. The scene painting in the theater was the work of a local artist, a Raleigh miner, being the exact reproduction of the entrance to President Wright's Cincinnati home. On the opening night a play, "The Country Store," was produced by local talent, the players being aided by a chorus of some 50 mine employees' daughters dressed in white and suitably adorned with the colors of the Raleigh Mining Institute. These girls did the flag drill amid much applause.

As the stage is large it was possible to serve on it at the close of the entertainment a supper for about 400 guests. An undenominational Sunday school has been started by the mining institute and is being well attended.

Wilkes-Barre Mining Institute

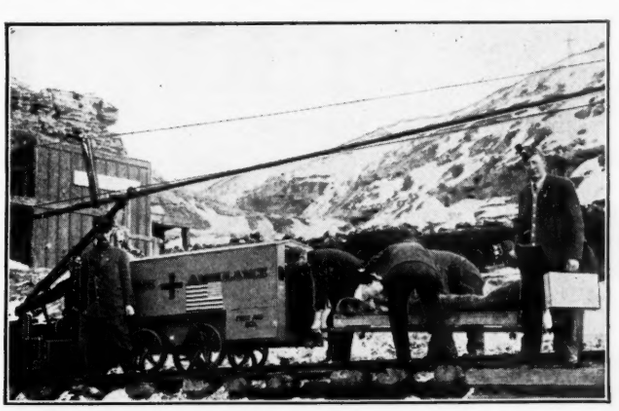
The annual dinner of the Wilkes-Barre Mining Institute was held Wednesday, Apr. 5, at the Irem Temple, Wilkes-Barre, Penn., and was attended by over 1,000 members and guests. It was the sixty-third meeting and the ninth annual dinner of an institute which yearly grows in numbers, enthusiasm and productive effort.

The most interesting part of the program was the masterly oratorical address of M. F. McDonald, an attorney of Wilkes-Barre, himself a product of the breaker, who represented himself as having proved extremely inefficient when he sat on a board on the picking table. That splintery board appears to have lost a negligent picker and the bar acquired an attorney of marked eloquence.

An excellent dinner was furnished by the institute, the serving being done by the students of the school. In the program which followed, the Hon. Benjamin R. Jones was the toastmaster; the President of the Institute, H. G. Davis, made his annual report; addresses were made by M. F. McDonald and B. F. Tillson; and stories were told by W. A. Rogers, of the Wilkes-Barre Y. M. C. A., who is an extremely droll *raconteur*. The musical preferences and abilities of the many Welshmen present were reflected in the songs during the banquet, the singing of the institute quartet and the solo of Gomer W. Morgan. The hall was somewhat large for singing, but the voices fully vindicated the ability of the Welsh as vocalists.

Underground Mine Ambulance

The transporting of persons injured in the mines from the working face to the outside, especially when the distance to be traveled is great, has long been a serious problem. At No. 7 mine of the Union Pacific Coal Co., Rock Springs, Wyo., the mine foreman, John Maxwell, and the assistant mine foreman, Charles Gregory, have successfully solved this problem by designing a mine



ELECTRICALLY HEATED MINE AMBULANCE OF UNION PACIFIC COAL CO. AT ROCK SPRINGS, WYO.

ambulance the construction details of which are quite original.

The accompanying illustration shows Mr. Maxwell standing by the ambulance and Mr. Gregory on the right, with the first-aid box in his hand.

The ambulance is roomy enough to accommodate the patient and an attendant without inconvenience. It is electrically lighted and heated and is equipped with a cot suspended from springs to obviate any jarring. On either side are receptacles for first-aid supplies, hot-water bottles, blankets, etc.

It was formerly a custom at this mine when men were injured to place them on a stretcher and transport them in a mine car to the surface. As the distance to be traveled was often from three to four miles, the injured men frequently became chilled and suffered from shock, no matter how well they were protected by blankets.

As they traveled this distance against the intake air current, which moves at a high velocity and which is, especially in the wintertime, of a very low temperature, the injured persons often suffered severely and their recovery was materially retarded.

Clubhouse Opened for Miners

The Main Island Creek Coal Co., of Omar, W. Va., has recently opened its new clubhouse. At present 30 bedrooms are occupied. Ten of these rooms have running water. The clubhouse is situated at an advantageous point near the main office and the No. 4 storehouse of the company. The porch is being inclosed in glass and is spacious enough to be used for dancing purposes. It is heated by steam, as is the entire building.

In the living room there are a large, old-fashioned fireplace, a pianola and a victrola, and many enjoyable evenings are expected by the boys. The bathhouse, containing 50 showers, is not quite completed.

German Miners' Daily Wage

The magazine entitled "Soziale Praxis und Archiv für Volkswohlfahrt," or roughly, "Social Practice and Public-Welfare Record," published in Berlin, has an article on "The Wages of Miners in the First Year of the War." This article translated forms part of the Monthly Review of the United States Bureau of Labor Statistics for April and is here reproduced:

According to statistics recently published by the Prussian superior mine offices the average wages per shift paid to coal miners during the first four quarterly periods after the outbreak of the war were as follows:

WAGES OF COAL MINERS IN GERMANY PER SHIFT, 1914 AND 1915

	1914		1915	
District	Third Quarter	Fourth Quarter	First Quarter	Second Quarter
Upper Silesia	$0.869	$0.814	$0.857	$0.902
Lower Silesia	.828	.807	.812	.857
Ruhr district	1.242	1.197	1.233	1.283
Saar district (state mines)	1.052	1.012	1.004	1.026
Aix la Chapelle (Aachen) district	1.142	1.095	1.114	1.138
Left Rhine district	1.307	1.271	1.278	1.349

From this table it is evident that during the second half of 1914—that is, during the period in which, on account of the outbreak of the war, the increase of the cost of living was largest—the wages of coal miners decreased. The miners' federations made representations to the minister of commerce, which resulted in pressure being brought to bear on the mine owners to increase the shift wages of their workmen, and in the second quarter of 1915 small increases were granted in all mines. In the state mines, however, the average wage paid during the second quarter of 1915 is still below that paid during the corresponding quarter of 1914.

In considering the average wages shown here it should not be forgotten that the character of the working force in the coal mines has changed since the beginning of the war. Large numbers of coal miners were called to military duty, and unskilled juvenile and female workers took their places, which naturally decreased the average working efficiency, a fact which became evident in the earnings of contract workers paid on a tonnage basis. The wages of miners proper—that is, miners and apprentice miners working below ground—show larger increases than those of unskilled workers.

The average daily wages for the individual classes of mine workers during the second quarter of 1914 and of 1915 are shown in the table following:

AVERAGE DAILY WAGES OF MINE WORKERS IN GERMANY DURING THE SECOND QUARTER OF 1914 AND OF 1915

	Miners Proper		Underground Workers		Surface Workers		Young Male Workers		Female Workers	
District	1914	1915	1914	1915	1914	1915	1914	1915	1914	1915
U. Silesia	$1.159	$1.257	$0.840	$0.909	$0.771	$0.838	$0.295	$0.336	$0.309	$0.343
L. Silesia	.935	.978	.830	.871	.754	.802	.319	.359	.412	.431
Ruhr	1.473	1.585	1.075	1.116	1.040	1.100	.343	.393	....	....
Saar*	1.209	1.209	.983	.981	.916	.933	.340	.367	....	....
Aachen	1.292	1.342	1.031	1.061	.981	1.026	.390	.400	....	....
Left Rhine	1.461	1.552	1.188	1.216	1.050	1.109	.376	.376	....	....

* State mines.

[The war started Aug. 1, 1914, so the figures given in the second table are illustrative of conditions both prior to and a little less than a year after the war commenced.]

Meeting of Mining Section of National Safety Council

The Mining Section of the National Safety Council, with B. F. Tillson in the chair, had a committee meeting in Wilkes-Barre on the morning of Apr. 5 to discuss the formation of local sections of the National Safety Council and the direction of the safety work of the organization.

After the meeting a lunch was given by H. G. Davis, the second vice-chairman, the persons present, including the committeemen, being H. G. Davis, district superintendent, Coal Mining Department, Delaware, Lackawanna & Western Railroad Co.; Charles Dorrance, Jr., general superintendent, Hudson Coal Co.; C. K. Gloman, chief clerk, Susquehanna Coal Co.; J. H. Haertter, division superintendent, Lehigh Valley Coal Co.; R. D. Hall, associate editor, *Coal Age*; F. R. Hemelright, president Temple Coal Co.; John Lloyd, safety inspector, Lehigh Valley Coal Co.; E. J. Newbaker, division superintendent, Lehigh & Wilkes-Barre Coal Co.; R. A. Quin, general manager, Susquehanna Coal Co.; D. R. Reese, general attorney, Delaware, Lackawanna & Western Railroad Co.; Thomas Thomas, general superintendent, Lehigh Valley Coal Co.; B. F. Tillson, chief engineer, New Jersey Zinc Co.; T. H. Williams, general superintendent, Kingston Coal Co., and H. M. Wolflin, engineer, Bureau of Mines.

At this meeting those present agreed to inaugurate a Wyoming Valley section of the National Safety Council and to plan for further safety work in the neighborhood of Scranton and Wilkes-Barre. H. G. Davis was elected chairman and was asked to organize the new work.

Discussion by Readers

The New Anthracite Sizes

Letter No. 1—Permit me to take exception to the statement made in the editorial on "The New Anthracite Sizes," *Coal Age*, Mar. 11, p. 463. I refer to the paragraph on page 464, in which you say, "In the first place, it is well known that pea coal, because of its comparatively low price, is extensively used in cooking stoves, when as a matter of fact it is not at all adapted to that purpose."

Allow me to state that I have been engaged in the mining and shipping of anthracite since 1876, during which time I have continued to cover as wide a territory as any miner or shipper engaged in the business. I want to say that pea coal is used very largely in kitchen ranges, and its use has been increasing rapidly in that regard. The demand that has developed for this size of anthracite, owing to its low price and good fuel value, is evidenced by the fact that in 1880 I held a contract for the entire output of a certain colliery at 50c. per ton at the mine.

The arbitrary change of sizes to which you refer is, in my judgment, unwise and cannot be made without creating a much greater disturbance in the coal trade than would be warranted by the benefit that would be likely to ensue. A mixture of fine grade with a larger size of coal is of advantage in closing up the spaces and thus permitting the entire body of coal to burn to ash, instead of leaving the larger pieces partly burned, which is a common experience. But I am certain that retail dealers, as well as consumers, would very much prefer to buy their coal in the present sizes and make this mixture for themselves, rather than to have this done arbitrarily, as such procedure would undoubtedly oblige many to change their heating apparatus.

It will be interesting to hear what the retail dealers and consumers have to say on this question. The information that comes to me from these sources is that they are satisfied with the present sizes. Pea coal is the principal fuel used in the upper portion of the Wyoming coal field, both in ranges and furnaces. I have used it in my own furnace exclusively for nearly 40 years and have been active in introducing it for these purposes among my customers. Many retail dealers have for several years sold chestnut and pea coal together as a kitchen mixture.

DEALER.

——, Penn.

[It is true, as stated in our editorial, that pea coal is extensively used in cooking stoves or ranges. It is also true, however, that pea coal is not adapted for this purpose, for the reason that both stoves and ranges are made with small burning surfaces, which are only adapted to a larger size of fuel, such as chestnut. With the larger grate surfaces used under steam boilers, pea coal makes an excellent fuel. There is undoubtedly good fuel value in pea coal, but this is not nearly so high as in the next larger size (chestnut), since the smaller the coal the greater the ash content.

Regarding the new sizes of anthracite, we belive that the retailer is gradually coming to favor this change. In our correspondent's own state of Pennsylvania, the Retail Coal Merchants' Association, which is one of the largest and most progressive of such societies, unanimously petitioned the anthracite operators to make the change. The Philadelphia Coal Exchange has since similarly fallen into line. The mining interests on the other hand seem to be forced only by circumstances to make the change. It goes without saying that no business can be profitably conducted by producing more than it sells. However, this is what the operating companies are doing at the present time, as is evidenced by the stock now on hand of the slowly moving sizes that are carried in storage from one year to another. These sizes, for which there is little demand, are sometimes moved by cutting the price, but if all the companies followed this practice, it would result in disaster.

We agree with our correspondent that it would be interesting to hear from others on this subject.—Editor.]

Accident in Electric Blasting

Letter No. 8—Referring to the accident that occurred in firing an electric shot, as described by J. T. Reynolds, *Coal Age*, Jan. 29, p. 221, W. T. M. remarks in his Letter No. 5, Mar. 25, p. 546, "Like Mr. Reynolds, I feel that it would be impossible for an explosion to take place after the wires are disconnected from the battery."

I am glad that this important subject has come up for discussion in *Coal Age*, and though not an expert writer, I will try to tell what I have found to be true in reference to misfire shots when blasting by electricity. In my inspection of 15 mines, it has been reported to me four or five times that single shots—not a series of holes—have exploded after the wires were disconnected from the battery. On one occasion our general mine foreman reported to me that he came very near being shot by a blast going off after the wires were disconnected. In the same way, I can produce four or five men who will testify to shots going off in the same manner.

It will be well for W. T. M. not to be too sure that all the detonators are good. The government men recommend No. 6 detonators, but some men are foolish enough to use No. 4 detonators in some cases, which practice generally gives trouble. In a book entitled "The Shotfirers' Guide," William Maurice explains such occurrences on pages 92 and 93 as follows:

Hangfires, or retarded ignition, may occur in the electric detonator or may occur in the explosive. A damp detonator might readily hang fire. It is well known that a shot will sometimes explode after a prolonged turning of the exploder handle, whereas in general less than half the current will suffice. The retardation might be caused by an increased resistance in the circuit through partly broken wires, bad joints, or grease or dirt on the spring contacts at the terminals, thus permitting the passage of

only just sufficient electrical energy to warm the fuse bridge. The latter must then be kept heated during several seconds before the temperature rises to the point necessary for the ignition of the priming.

The same effect may be produced if the exploder is underpowered, owing for instance to loss of magnetism. Or delayed ignition may be caused by defects in the fuse, as when the fulminate is badly mixed or damp, or there is insufficient priming, or the charge is wet.

On page 93 of the same book there is a part of an English mine inspector's report for 1906, describing how a shot went off five minutes after the wires had been disconnected from the battery.

In conclusion, allow me to say that we have a strict rule in our mines that no person shall return to a misfire shot where a battery is used for at least 10 minutes after the battery has been applied and the wires disconnected. Like Mr. Reynolds and W. T. M., I don't believe there are 10 per cent. of the men in our mines today who know that it is possible for a shot to go off after the wires have been disconnected. SAFETY FIRST.

Greensburg, Penn.

Letter No. 9—Again referring to the letters that are appearing in *Coal Age* on "Handling Explosives in Mines," permit me to comment on the thawer for dynamite described in Letter No. 5, Mar. 18, p. 508, by H. L. Handley. The apparatus he describes I think all explosives men will agree is of a dangerous character. The electric lights below the latticed bottom may seriously overheat the explosives. Particles of sawdust may fall on the electric lights, become charred and possibly cause flame, or some particles of the explosive may drop onto the hot bulbs. The ventilation described would be entirely inadequate, as the piled-up explosives would stop free circulation. It is considered most dangerous to place an original source of heat directly under explosives. Hot-water coils at one side are the best medium, but in any case electric heaters should not be installed in wooden or combustible boxes.

In regard to a brick magazine for the storage of explosives, permit me to say that this is not considered good practice, since in the event of an explosion the bricks become harmful projectiles. A wood-lined, corrugated-iron structure is safer and better, or a massive structure of weak concrete, which would be disintegrated in case of an explosion as described in Technical Paper 18.

Denver, Colo. MINING ENGINEER.

The Miner and "Safety First"

Letter No. 7—The interesting Foreword in *Coal Age*, Feb. 19, p. 321, on the carelessness of miners, recalls some experiences of my own along that line.

For the past two years I have been what is called in this mine "airman." My duties are to attend promptly to the removal of any gas that may be found and reported by the fireboss after making his examination of the mine in the morning. When the fireboss discovers gas in a working place, he at once puts up a danger sign to notify the miner who works in that place that it unsafe and that he must not enter. When such a place is found the fireboss reports it to me as soon as he reaches the shaft bottom, and I proceed at once to remove the gas so that the miner can get to his work.

More than once, to my surprise, on reaching the place, I have found the danger sign kicked aside and the miner at work in the face of his room. When I think of it I wonder that more miners are not burned by such foolhardy carelessness and neglect of danger.

Another instance of carelessness on the part of miners that I have observed is the way they do when obliged to travel haulage roads in going to and from their working places. When they meet a motor pulling a heavy trip of cars, they will step to the side of the road to allow it to pass, but as soon as the last car has gone by they again jump into the road without waiting to see whether a car that may have broken loose from the trip is following. There is one man now lying in the hospital as a result of his lack of care in looking up the entry before again stepping into the road.

Again, miners are very careless in the way in which they handle their powder in the mine. Every mine foreman knows the danger due to the careless handling of powder and should warn the men constantly to use more care when charging their holes and to keep the powder in a place where the flame of the shot will not reach it. Many a miner has lost his life and many others have been seriously burned because they have used no care in preparing a shot. CHARLES SCHOONOVER.

Bicknell, Ind.

Effect of Fall of Barometer on Emission of Gas

Letter No. 1—Referring to the answer given to the question relating to the possible effect of the fall of barometer on the emission of gas, which appeared in *Coal Age*, Mar. 25, p. 550, I would like to say that as a pupil of the Universal Mining Correspondence School at Derby, England, some years ago, I was taught that it was necessary to be on the alert and exercise more caution in a coal mine at the time of a sudden fall of the barometer. Indeed, any barometric change, whether a rise or fall of the barometer, was to be noted, but we were instructed that a falling barometer marked a particularly dangerous period in the mine.

When employed in the steam coal mines of South Wales, the miners had the privilege of selecting men from their own number once a month to accompany the fireboss when he inspected the mine during working hours. Neither the day chosen for this purpose nor the men selected were known to the manager or superintendent of the mine until they reported to him after completing the examination. It was frequently my privilege to be chosen for this important work. I remember that I would generally choose a day when the papers reported a barometric change as taking place, and more than once the fireboss would remark to me, "Well, Bill, you expect to see the gas showing its teeth today, don't you?"

During my life in Wales I have noticed that the larger mine explosions have occurred during periods of sharp barometric changes. I will mention a few of these, and perhaps some *Coal Age* readers can confirm my point. There were the Dinas explosion of Jan. 13, 1879; the Penygraig explosion, Dec. 10, 1880; the explosion at the Albion colliery, Cilfynydd, June 23, 1894; at Tylorstown, Jan. 27, 1896, and at Wattstown, July 11, 1905.

If it is true that the fall of the barometer does not cause a heavier flow of gas into the mine, all Professor Gallo-

way's teaching at Cardiff and that at the Universal Mining School at Derby, and the claims of numerous other writers on this subject, together with my own experience, are wrong and misleading. I would like to have a fuller explanation of the answer given to the inquiry in *Coal Age,* to which I have referred. MINER.

Carbondale, Penn.

[Our correspondent has failed to comprehend the meaning of the word "emission" of gas, which describes the outflow of gas occluded in the coal and which issues from the pores of the coal. The term "emission" does not relate to the flow of gas from fissures or pockets in the coal and adjoining strata. Neither does this term refer to the outflow of gas from abandoned workings and other areas in the mine where it has accumulated.

The teachings of Professor Galloway and others and the experience of our correspondent are quite correct in proclaiming that a falling barometer always marks a danger period in coal mining, such periods being accompanied invariably by an increase of gas in the mine air. This outflow of gas, however, proceeds from the crevices, fissures and pockets formed in the coal and adjoining strata and from accumulations of gas in the void places and abandoned areas in the mine. The increase of gas in the mine air is not due to an increased emission or flow of gas from the pores of the coal. Experiments have shown that the outflow of gas from the pores of coal is not appreciably more rapid, even when the coal is placed in a vacuum, as compared with the outflow or emission of gas under atmospheric pressure.

A fall of 1 in. in barometric pressure, under a constant temperature, would cause an expansion of air or gas equal to 1.0345 times its original volume; that is to say that 10,000 cu.ft. of air or gas would be expanded to 10,345 cu.ft. under these conditions. In other words, 345 cu.ft. of this volume would be thrown off onto the airway during the time that the barometer was falling 1 in. But it is very seldom that the barometer drops more rapidly than 1 in. in 8 or 10 hr., and it is easy to see that the increase in the gaseous condition of the air current in a well-ventilated mine would be hardly appreciable, owing to the large volume of air circulated through the airways in that time.

The danger, however, as we have previously remarked in reply to an inquiry, *Coal Age,* Jan. 15, p. 136, is experienced in the poorly ventilated places of the mine and in pillar workings, where the effect of pressure changes is most keenly felt. In this connection, we would refer our correspondent and others who doubt the accuracy of this reasoning to the complete answer given to that inquiry, which related to the use of the barograph in coal mining.—Editor.]

Letter No. 2—Referring to the answer to the inquiry, in regard to the effect of a fall of barometer on the emission of gas, *Coal Age,* Mar. 25, p. 550, let me say that from practical observation it is my opinion that a fireboss will find more gas showing in a gassy mine while the barometer is falling, even though there are no old goaves or large abandoned areas in the mine.

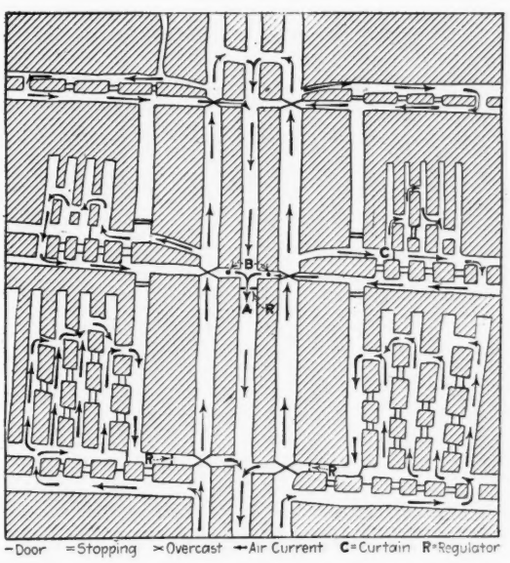
In almost all mines there are rooms that are on the point of falling or caving in, and the heaviest roof falls usually take place when the atmospheric pressure is reduced. I may say, also, that my experience has been that gas is given off more freely at faults in mines when the barometer is falling than at other times. I have observed that the increase of gas coming from these two sources is sufficient to give the fireboss some trouble when the mine atmosphere is already somewhat loaded with the gas ordinarily exuding from the newly exposed surfaces of the coal at the working face. W. H. LUXTON.

Linton, Ind.

Locating a Booster Fan

Letter No. 2—Referring to the inquiry of P. J. Doolan, *Coal Age,* Mar. 25, p. 550, permit me to suggest two different plans or propositions, the first of which is based on changing the system of ventilation that he has presented, while the second accepts the ventilation shown in the figure that appeared with this inquiry. I would suggest the following:

1. Arrange the circulation of air so as to provide a separate current in each of the districts shown on the



PROPOSED CHANGE IN CIRCULATION AND LOCATION OF BOOSTER FAN

right and left of the main airways, provided the future development of the mine will warrant making this change. This will necessitate building two overcasts, one at the mouth of each of the return airways of the several ventilating districts, and driving crosscuts in the main entry pillars at these points, so as to permit the return current from each district to pass into the main return airway, as I have indicated by the arrows in the accompanying figure.

The only reason that I can suggest for the arrangement shown in the first figure given by Mr. Doolan is that it avoids the use of trapdoors on the main haulage road or roads. But this may be the cause of the insufficiency of air in the mine. It may be, also, that the curtains shown in Mr. Doolan's plan are not properly deflecting the air, but permit too much leakage and thus cause a deficiency of air at the working faces of the rooms. I may be wrong in this conclusion, but it was suggested to me by the fact that doors were used in the other entries. I would use automatic doors that could be opened by a

mule passing in either direction, so as to avoid the use of trappers.

In this plan I would place the booster fan at the point marked *A*, in the same manner as indicated in the answer that appeared in reply to Mr. Doolan's inquiry. Then if the main fan was picking up too much of its load and producing too much air in the first two districts on the right and left of the main airways, I would place regulators as indicated at *RR*, just inside of the two overcasts, so as to give more air in the other districts of the mine. However, if the booster fan at *A* is carrying too much load, these regulators would not be needed, but I would then place a regulator on the main return, just inside of the booster, as indicated at *R*, unless I could regulate the speed of the booster so as to produce the desired quantity of air in these two districts. The use of regulators should always be avoided as far as possible, as they increase the resistance of the mine.

Location of Booster, Circulation Unchanged

2. In case it was not advisable for any reason to change the circulation in the manner I have suggested, I would then place the booster fan at either of the two points marked *B*. In this case the air would circulate throughout the mine in the same manner as shown in Mr. Doolan's plan, and it would be necessary to regulate the speed of the booster so as to produce the desired quantity of air on each side of the mine, or this could be done by means of a regulator placed just inside of the overcast nearest to the booster. W. H. L.

Linton, Ind.

Letter No. 3—Referring to the inquiry of P. J. Doolan, *Coal Age*, Mar. 25, p. 550, permit me to suggest that it has been proved, both technically and theoretically, that when two fans are arranged to work tandem on the same air current, which passes in turn through each of the fans, the quantity of air in circulation will not be increased.

In the case in question, in my opinion, if the center entry is the haulage road, better results will be obtained by placing a fan at the mouth of each side entry, operating each fan as an exhaust. This would make the haulage road the intake aircourse.

If, however, the side entries are the haulage roads for their respective sides of the mine, the plan I would adopt would be to widen the main or center entry, from its mouth to a distance of about 50 ft. inby, so that a partition could be built dividing this portion of the entry into two return aircourses of equal size with the main return airway. I would then place one fan at the mouth of each of these airways, so that they would work side by side, each drawing the air from its respective side of the partition. In this position each fan would handle the same quantity of air, or one-half of the main return current.

Then, as the quantity of air in circulation increases as the cube root of the power producing circulation, and this power is doubled by the use of two fans, the quantity of air circulating in the mine will be increased as the cube root of 2, or $\sqrt[3]{2} = 1.26$ times the original quantity, giving in this case $30{,}000 \times 1.26 =$ say, 38,000 cu.ft. per min. Nels B. Bolling.

Adamsburg, Penn.

Thrift Among Miners

Letter No. 4—I have been greatly interested in the recent discussion in *Coal Age*, of the subject "Thrift Among Miners." Unfortunately the lack of thrift has proved a real drawback to the mining industry and will so continue till some adequate means is found of dealing with the evil.

Many people attribute thriftlessness to the miner's love for booze, but after living many years in a prohibition state I can testify that the suppression of the liquor traffic has left the matter of thrift untouched. In fact, prohibition has caused many of our miners to be arrested and imprisoned for bootlegging and similar violations of that law.

There are many factors involved in the solution of the question of thrift, and while most of us deplore the hard times caused by industrial depressions, I believe that such periods are the best things that could happen to teach thrift to those whom we hope to reform. This statement may sound startling and somewhat rash, but if we examine it carefully we may discover that it contains an element of truth, which is its justification.

Ostel Bullock, in *Coal Age*, Apr. 1, p. 608, says: "One great reason for the miners' wasteful expenditures is the numerous idle days when they are forced to loiter about town instead of being at work in the mine." I am inclined to take issue with this statement. I believe that the many idle days, instead of causing wasteful expenditures, are the means of teaching the miner slowly but surely the lesson that he must exercise thrift in order to tide himself over these periods of industrial depression. He is now beginning to realize that if he can support his family on working two days per week, he ought to be able to save something and dress well when he can work six days in the week.

Thrift a Question of Environment

To my mind the whole question, expressed briefly, is one of environment, and a change in the environment of the miner will mean a change in the miner himself. The result of the activities of many operators along this line is being demonstrated by the large number of people that are in attendance on gala days, such as first-aid meets and other events, which are becoming more popular in mining communities every year. No one will deny that there has been a great change, both morally and socially, in the miner in the last ten years, and this in my opinion is due in a great measure to the activities of the welfare departments in establishing clubhouses, kingdergartens, theaters and other places of recreation where miners and their families may go to spend a few leisure hours.

Education seems to be the keynote of all our higher conceptions and purer ideals relating to thrift and morality. Therefore if we are desirous to help the raising of the coal industry to a higher plane, which will make better men of our miners, we should strive to get them interested in the various reform movements that are being continually added to our mining operations all over the country. This seems to me to have worked wonders in the past and makes me feel that we cannot have too much of these good things.

Kimberly, Ala. William Crooks.

Inquiries of General Interest

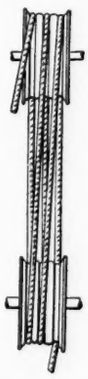
Endless-Rope Winding Drum

We have at our mine a small electric hoist with a 24-in. drum that we would like to use in driving an endless-rope haulage if we can overcome the difficulty that is presented by the tendency of the rope to climb the grooves and run off the drum. Can you suggest a way that the rope may be made to spool on and off the drum properly?

Handley, Penn. J. L. GUNTER.

The use of a single drum in endless-rope haulage always develops a fleeting of the rope. That is to say, the rope travels from one side of the drum to the other or tends to climb on itself.

This fleeting of the rope can only be overcome properly by the use of two drums placed tandem to each other, either in line with the rope or one above the other, as illustrated in the accompanying figure. The rope winds on the upper drum in the first groove, and passing over the second drum, winds off the corresponding groove on that drum. From there it passes to groove 2 on the first drum and then to the corresponding groove on the second drum, following the same order until it finally passes off the last groove on the second drum, as illustrated in the figure. It is not necessary to have more than two coils or grooves on each drum, except where there is a possibility of the rope slipping on the drum, when the number of turns on each drum should be increased.



Cost of Coal at Boston

Can you tell me the average yearly wholesale price of American bituminous coal f.o.b. Boston for the ten years 1904 to 1914, for each year? Also you may remember that some time last summer the Dominion Coal Co. made a contract with one of the American railways operating in Maine or Massachusetts, and that there was quite an outcry about it. In the material that was published on this subject at the time was there any mention of the price paid? CANADIAN.

Sydney, N. S., Canada.

There is no authoritative tabulation of "the average yearly wholesale price of American bituminous coal f.o.b. Boston for the ten years 1904 to 1914." As conditions are or have been in that market, such figures would be rather difficult to compute. Kinds of delivery, variations in draft of water alongside, different grades of coal loaded at the same piers, varying types of carriers and methods of discharge, fluctuating marine freights, some ships on a per ton and others on a per diem basis and a general lack of uniformity in purchase are only some of the factors that would enter into such a computation. It would be very hard to standardize such prices in a way that would make them of any value.

The bulk of the steam coal used in that market is Pocahontas and New River, the so-called "smokeless" coals, shipped by water from Norfolk and Newport News, Va., and conditions turn largely on the output of those coals. The only records available are private ones, but a tentative table might be compiled based on contracts such as those of the larger street railways, they being competitive and usually reflecting something near average conditions. The figures would be something likes these, all for gross tons of 2,240 lb., for Pocahontas and New River steam coals, average contract price delivered alongside Boston wharves:

Year	Price F.o.b. Norfolk	Marine Freight	Price Alongside (C.i.f.) Boston
1904	$2.50	55@60c.	$3.05@3.15
1905	2.50 to Oct. 1 2.60 thereafter	70@80c.	3.35
1906	2.65 to Aug. 1 2.75 thereafter	50@55c.	3.10
1907	2.75 to Sept. 1 2.90 thereafter	90c.	3.55
1908	2.65 to Sept. 1 2.50 thereafter	50@60c.	3.10
1909	2.25@2.40	60@65c.	2.85@3.05
1910	2.50	60@70c.	3.20
1911	2.40@2.50	60@75c.	3.05@3.20
1912	2.50@2.60	70@75c.	3.20@3.35
1913	2.60@2.75	75c.	3.35@3.50
1914	2.50@2.65	50@55c.	3.00@3.20
1915	2.60@2.70	75@80c.	3.35@3.50
1916	Large volume of coal sold in October, 1915, for delivery Apr. 1, 1916, to Apr. 1, 1917, on the basis of $2.50 f.o.b. Norfolk plus 70c. water freight, or $3.20 alongside plus insurance.		

These figures of course represent only one view of the prices obtained on the largest portion of Pocahontas and New River placed in that market in the years stated; that is, the approximate prices paid by the largest and most careful buyers.

With regard to the arrangement entered into by the New Haven and the Boston & Maine railroads and the New England Gas and Coke Co. and the Dominion Coal Co. late in the fall of 1914, no price was mentioned in what was published at the time.* It is commonly accepted, however, that the provincial coal was billed at $2.70@2.80 delivered alongside Boston.

The records of receipts of provincial coal at Boston bear out the prediction made at the time that the tonnage of Cape Breton coal would not increase by the amount the New Haven and the Boston & Maine were understood to have bought, namely, 275,000 tons. And then, of course, Cape Breton coals are not at all on a parity with Pocahontas and New River. The difference in fuel efficiency between these different coals is a very wide one.

Correction

Attention has been called to a "seeming error" in the formula given for estimating the horsepower H required to drive a shaker screen weighing with its load W lb., the driving shaft having a speed of n r.p.m. and a stroke of l in., *Coal Age*, Apr. 1, p. 609, as follows:

$$H = \frac{Wn^3l^2}{28{,}000}$$

The formula is correct, but the speed n is hundreds of r.p.m. Thus, for a speed of 90 r.p.m., $n = 0.90$, etc.

*The "New Haven's Purchase of Canadian Coal," "Coal Age," Vol. 6, p. 912.

Examination Questions

West Virginia Firebosses' Examination, 1916

(Selected Questions)

Ques.—Should the fireboss possess other qualifications than those required by law?

Ans.—Besides having a knowledge of firedamp and other dangerous gases that will enable him to detect the same by the use of a safety lamp, and a practical knowledge of mine ventilation and the machinery and appliances used for that purpose, and besides having had at least three years experience in mines generating gas, as required by law, the fireboss must be a painstaking, conscientious, honest and industrious man. He must have both good eyesight and hearing and be observant of every detail connected with the examination of the mine.

A fireboss should also have a practical knowledge of geological formations that will enable him to judge correctly in respect to the settlement of the roof following the extraction of the coal and the effect of fault lines and other irregularities that occur in the strata. Though fearless of danger, he must be cautious and have a high regard for the safety of the lives of the men in his charge and the security of the mine.

Ques.—What is a safety lamp; how is it constructed; for what purpose used; when is it unsafe and what instructions should be given to the workmen using the same?

Ans.—A safety lamp is one in which the flame of the lamp is isolated from the outside atmosphere by reason of its being inclosed in a combustion chamber all openings to which are protected by wire gauze. In the Clanny type known as the "working lamp," the flame is surrounded by a glass cylinder, which is surmounted by a gauze chimney, the latter being often protected by a steel bonnet. In the old type of Clanny lamp, the air entered the combustion chamber through the lower portion of the gauze chimney and descended to the flame, but the descending and ascending currents caused the lamp to smoke. This condition was improved later by admitting the air through openings below the flame, these openings being protected by wire gauze.

Safety lamps are used for working in gaseous mines and for the purpose of testing for gas wherever its presence is suspected. A safety lamp is unsafe when handled by an inexperienced person; when exposed for too long a time to a body of gas; when not properly cleaned and put together, or when there is any imperfection in the gauze. A safety lamp should never be carried against a strong air current or swung backward and forward or held in an inclined position or permitted to fall, since any of these conditions would render it unsafe in the presence of gas.

Workmen using safety lamps should be cautioned not to tamper with their lamps in any manner whatsoever, and instructed that, in case a lamp is accidently extinguished, no attempt must be made to relight it in the mine, but the lamp must be returned to the lamp station. All workmen, before being intrusted with a safety lamp, should be trained in its proper use and cautioned against exposing the lamp to gas unnecessarily or permitting anyone to handle and play with the lamp in their charge. They should be told to keep the lamp in a safe place where it will not be injured by flying coal or by an accidental blow or by falling.

Ques.—Would you consider it safe to work with open lights in any portion of a mine liberating explosive gases?

Ans.—No! Open lights should never be used in any portion of a mine generating gas in explosive proportions; that is to say, where gas is being liberated in sufficient quantity to render the atmosphere of the place explosive. Wherever safety lamps are used at the working face owing to the presence of gas, no open lights should be permitted to be used in any portion of that mine, except it may be on the main-haulage road and the shaft bottom, by trip-runners only.

Ques.—In mines liberating explosive gases, what precautions would you take to insure the safety of the workmen?

Ans.—The mine should be worked exclusively on safety lamps of an improved type. These lamps should be the property of the company and should be regularly cleaned, inspected, filled and lighted at a lamp station on the surface, by a competent person or persons who should deliver a safety lamp to each miner at the beginning of a shift and receive the same from him on his return from the mine. Every miner should be instructed and trained in the proper use and handling of a safety lamp before it is committed to his charge. Each miner should be examined to see that he has no matches or other means of striking a light.

Ques.—What is a regulator; how is it constructed; where is it placed; and how is the ventilation of the mine affected by the placing of a regulator in the air current?

Ans.—The regulator, in mine ventilation, is a device for proportioning the air traveling in two or more splits in the mine, to the conditions or requirements in each split. Regulators are of two kinds, known as the "box regulator" and the "door regulator." The box regulator is a brattice or board stopping built in the airway and having an opening in its center provided with a sliding door, by means of which the size of the opening can be increased or decreased as desired. The box regulator is usually placed at or near the mouth of the return airway. The door regulator is a door placed at the mouth or intake end of an air split and swung into such a position that it divides the air between the two entries in the proportions desired. There is a set-lock that holds the door in this position.

Any form of regulator acts to increase the resistance of the mine, although this resistance is increased to a greater extent by the use of the box regulator than by the door.

Coal and Coke News

Washington, D. C.

Advances in the rates on bituminous coal from mines in Indiana and Illinois to points in Wisconsin and Michigan and to other interstate points, averaging generally 5c. per net ton, have been further suspended by the Interstate Commerce Commission from Apr. 13 until Oct. 13 of this year. These advances in rates were previously suspended from Dec. 15 last, but the Commission has not had time within which to complete its investigation into their reasonableness.

For like reason the Commission further suspended from Apr. 13 until Oct. 13 the increase in rates on coal in carloads from Benton and other producing points in southern Illinois to certain stations located on the Missouri Pacific Ry. in Missouri, Tuxedo Park, Mo., to Glencoe, Mo., inclusive. These proposed increases were previously suspended from Dec. 15 last.

The Commission also further suspended from Apr. 8 until Oct. 8 a tariff of the Atchison, Topeka and Santa Fe R.R. containing items providing for an increase in rates on coal from Raton and other points of origin in New Mexico to stations located on the Trinity and Brazos Valley Ry. in Texas, Cleburne to Limestone, Tex., inclusive.

Permission to establish rates on coal from Southern railway mines in Central Freight Association territory without strict observance of the long-and-short-haul clause of the act to regulate commerce, has been granted by the Interstate Commerce Commission. In this instance the Commission entered an order in substance as follows:

"That pending the action of the Commission upon any of the applications for relief from the provisions of the fourth section, filed by the carriers or their agents on or before Feb. 17, 1911, respecting rates on coal from Illinois and Indiana mines to Crystal City, Mo., as shown in tariff of Southern Railway Co., I. C. C. No. C-1625, the petitioners herein be, and they are hereby, authorized to establish a rate of 80½c. per ton on coal, carloads, from Illinois mines, and a rate of 95½c. per ton, carloads, from Indiana mines named in the said tariff to Crystal City, Mo., via Centralia, Ill. The Illinois Southern Railway Co., Ste. Genevieve, Mo., and St. Louis & San Francisco Railroad Co., provided no higher than the proposed rates from the points of origin described are maintained from any point intermediate thereto."

HARRISBURG, PENN.

Scarcity of labor in the anthracite and bituminous coal fields it is said has been the means of promoting peace between the operators and the men on the question of accident compensation. When the compensation law went into effect there were signs of much trouble owing to the plan of some companies not to hire old men or those with big families.

In various sections it is alleged it developed that the coal companies were anxious to get rid of aged men and likewise anxious to get rid of employees with large families. The movement had not gotten well under way before the miners began to resent it and there were signs of much trouble.

Just at this time a great exodus of men from the coal fields started. There had been a scarcity of laborers and other hands, but an exodus set in that has taken hundreds of young men to other parts. They can get more money it is said in other industries. The result has been that the companies have been compelled not to discriminate against the old men and those with big famliies. Help is needed in all sections, and no questions are asked now concerning age or the size of families.

Some coal companies are having difficulty in operating their collieries. Where several trainloads of loaded cars were shipped daily from some collieries, the output is now often less than 25 cars.

Within the past few weeks hundreds of men from the Panther Creek Valley alone, have gone to Bethlehem, Buffalo and to New England towns, where they have secured lucrative employment in the mills and factories. Because of the European war, no foreigners are coming to take the places of those who leave.

Not Even His Father May Employ a Minor

The prosecution of several coke workers in the Connellsville coke region by state officials recently for violation of the child-labor law of May 1, 1915, has called attention to an effect of its operation which is considered somewhat in the nature of a hardship by those who must bear the consequence of a violation.

The coke workers who were subjected to these prosecutions say they are being deprived of the services of their children which service has been helpful to the parents and without detriment to the children. At the same time the operation of the law handicaps parents in maintaining a proper control over their children, especially boys, and prevents the teaching of habits of industry at a period in their lives when they should begin to learn something more than to play or waste their hours in questionable pastimes.

In the hearing of the cases, it was charged that small boys were routed out of bed at midnight and forced to help their fathers on the coke yards until daylight, with the result that the boys were frequently too fatigued to do their school work during the day. This constituted an offense against the provisions of the law which prohibits employment of a child between the hours of 9 p.m. and 6 a.m.

In one of the cases a coke worker was fined for permitting his son to help him in the coke yard. The boy was employed only on Saturday mornings, which did not interfere with his attendance or work at school. It happened that this particular boy, it is said, is of a rather mischievous disposition and his pranks during his idle hours have cost his father a round sum in the past.

The boy's penchant for breaking windows and committing other depredations was discouraged, and to a large degree prevented while he was permitted to work for his father. Now that the child-labor law has been invoked in the boy's behalf, he is left free to follow his inclinations during his spare time. Being denied by the law the right to enjoy the benefit of his son's service, which also serves to keep him out of mischief and teach him habits of diligence, the father is now faced with the possibility that he may again be called upon to settle for other and more troublesome pranks of the youngster.

PENNSYLVANIA

Anthracite

Tamaqua—The Philadelphia & Reading Coal and Iron Co., whose Silver Creek workings adjoin the Alliance Coal Co.'s abandoned Kaska colliery has completed the drilling of an 8-in. bore hole which tapped the old Kaska shaft at a point 80 ft. below water level. The water from the flooded workings was being released at the rate of about 172 gal. per min., at the last report. Through the release of this water the weight on the barrier pillars between the two mines will be greatly lessened, and the employees of the Silver Creek colliery will be rendered more secure in their work.

The mines of the Maryd Coal Co., and other mines controlled by the Wentz interests went on a three-day schedule commencing with this week. The collieries of the Lehigh Coal and Navigation Co. will work four days per week. Number 14, or the Tamaqua colliery, of this company will suspend for about a month while the installation of an electric hoist is made. Labor shortage still continues at the mines. At the Jeddo mines of the G. B. Markle Co., 150 young men drew their time on the last pay day, and left for the large manufacturing centers.

Avoca—Fire destroyed a washery owned by Sullivan & Boland on Apr. 8. The blaze broke out soon after the men had left for their dinner and was discovered by the foreman. About 20 men will be thrown out of work and the loss is estimated at about $10,000. The washery was handling culm from banks formerly owned by Hollister & Bowman.

Hazleton—For the first time since Nov. 2, 1915, the Lehigh Valley Coal Co. mines of the Hazleton Division worked a full week during that ending Apr. 8.

Spring rains in the coal region have been so prolific that a number of the mines hereabouts have been unable to keep the water down to the working level. Recently the mines of A. Pardee & Co., and the C. M. Dodson Coal Co. were idle on this account, and in order to supplement the work of the pumps, water was brought to the surface in cars.

Pittston—The employees of No. 6 and No. 14 collieries on Apr. 6, showed that as a general thing they were against

"strikes," for a bowling match between teams representing these collieries of the Pennsylvania Coal Co. opened up a series of games between the company's collieries. It has been arranged for a series of athletic events to take place between the Northern and Southern Divisions during the coming summer.

Gilberton—Six collieries in the Shenandoah Valley were compelled to suspend on Apr. 7, for want of railroad cars. Thousands of men and boys were thrown idle.

Bituminous

Ernest—Officials of the Jefferson & Clearfield Coal and Iron Co. on Apr. 5, closed down the big mine here. The men did not return to work on the 3rd and 4th, but held meetings to discuss whether or not to return to work before the new scale is made. The company in the meanwhile decided on the shutdown.

Washington—One thousand miners at Ellsworth, Cokeburg and Acme in this district struck recently, on account of having their request for a 10 per cent. increase in wages refused.

Seward—The widows of the eight men killed on Mar. 30 by an explosion in the Robindale mine of the Conemaugh Smokeless Coal Co. have been awarded approximately $25,000 compensation. The coal company paid the widows the wages earned by their husbands during the last half of March, and the State Insurance Fund advanced them sufficient money to meet any emergency until the compensation started. This is the largest claim resulting from one disaster the State Fund has paid since the law became operative.

Connellsville—With a car supply equal to the demand the Connellsville coke production recently reached a high record with shipments of approximately 477,000 tons which is an increase of 135,000 tons over the first week in January. Labor conditions had also sufficiently improved to permit the placing of 150 additional ovens on the active list. There is still, however, a shortage of men and 4,000 ovens in the region are out of commission because sufficient labor cannot be secured.

Uniontown—Fire recently damaged the tipple and fan house of the Prospect Coal and Coke Co. at Dearth. The damage is estimated at $4,000. It is believed that the fire was of incendiary origin.

New Kensington—Approximately 2,000 of the 8,000 striking miners in the Allegheny and Kiskiminetas valleys recently returned to work. The men struck for recognition of their newly-formed union and some of their employers made this concession.

VIRGINIA

Pocahontas—The Baby Mine of the Pocahontas Consolidated Collieries Co. produced more coal during the month of March than during any other month in its history with but one exception. During 1915 there was one month's output that ran beyond that of March of this year.

WEST VIRGINIA

Huntington—It has been announced here that the amount of coal dumped, during 1916, at the Huntington tipple, of the Island Creek Coal Co. on the Ohio River, would be more than 50 per cent. greater than any year in the past. It was declared that the tonnage handled at the tipple would probably increase from 400,000 to more than 700,000 tons annually.

Fairmont—The opening of lake navigation is helping the operators and miners in this field, and contracts for lake deliveries have been closed for a considerable movement of coal from this region.

Elverton—The Branch Coal Co. is completing a slack chute and repairing 50 coke ovens which have been idle for many years. C. C. Beury, of Claremont is president, and W. J. Zimmerman, general manager at Elverton.

Williamson—It is said that the operators in this region have decided to employ a thoroughly competent secretary and publicity man, one who can give all his time to the interests of the producers in this field.

Rush Run—The Scotia Coal and Coke Co., G. H. Caperton, president of Charleston, G. H. Caperton, Jr., of Rush Run, general manager, has completed an incline to its new mine in the Sewall seam and will be ready for shipping from this measure in about a month.

Eccles—The New River Collieries Co., F. C. Bayles, general manager, is drawing pillars in the lower seam worked by this company, and at the same time sinking test holes through the coal measure above to ascertain if pillar drawing in the lower seam will injure the workability of the upper bed. It is expected that the 120 ft. of rock intervening between the two coal beds will arch, preventing the breaking up of the upper measure.

Beckley—The Virginian R.R. will soon put the new Stone Coal extension into operation, and work is progressing rapidly on the Piney extension from Pemberton. The new mines opening on these lines are equipping to produce a heavy tonnage. The high-carbon coals from this field, together with the splendidly equipped railroad serving the mines are expected to be an important factor in the export trade.

KENTUCKY

Mannington—The Belmont Coal Co., recently incorporated by B. D. Parker, Sintha Hogg and W. G. Parker, all of Drakesboro, to take over and conduct the Terry mine, opened operations on Apr. 1.

Hazard—The Kentucky Block Coal Co., which recently began operations at First Creek, recently reached its requisite minimum. The company has the first steel tipple in the eastern Kentucky field and the first retarding conveyor in the Hazard section.

Rockport—The Beaver Coal Co. has leased 10,000 acres of land in Ohio County and it is said will begin development there soon. I. P. Barnard, of Louisville, leased 7,200 acres and the J. B. Speed estate almost as much. The Beaver Coal Co. is a Delaware corporation.

OHIO

Gallipolis—The coal mines at Spillman, W. Va., situated on the Ohio River, 10 miles above here, were recently sold by Ambrose Gibbs to the Hallwood Coal Co., of Columbus, in which several West Virginia capitalists are interested. These mines were formerly owned by Senator Camden. They have an output of more than 1,000 tons per day.

Columbus—The Ohio Public Utilities Commission has decided that it has jurisdiction over a claim against the Hocking Valley R.R. based on an alleged overcharge for coal shipments between July, 1911, and July, 1915. It is stated that if a large number of claims of this nature now outstanding is considered and allowed by the board, the railroad company will have to return nearly $200,000 to shippers in various parts of the state, many of whom are coal operators in the Hocking district.

INDIANA

Vincennes—The Indian Creek coal mine, employing 490 men, has been closed down for at least a month, while a steel tipple is being installed to replace the wooden structure. The wooden tipple was adjudged unsafe by mine inspectors.

Terre Haute—The Terre Haute Trust Co. has been appointed receiver of the Terre Haute Oil and Coal Co. on the application of one of the stockholders, who alleges the company is involved to the amount of $150,000.

Clinton—At the first annual first-aid and mine-rescue meet held here, the team representing the Bunsen Coal Co. won first place; the Crown Hill second and the Miami Coal third. Twenty teams competed.

ILLINOIS

Coffeen—Announcement has been made that the Cloverleaf mine at this place has been closed down permanently. The unsatisfactory condition of the coal market is given as the reason.

Peoria—The Illinois division of the United Mine Workers has abolished the rule against members of the organization belonging to the state militia. The reason given is the probability of more men being needed to deal with the Mexican situation. Members are still forbidden to belong to a secret-service organization or a private detective agency, the boy scouts or the Civic Federation. Prosecutions were instituted at Hillsboro a few weeks ago against officials of the union who had excluded members of the militia from the organization. The case was not pushed after the men, at the direction of the state officials, were reinstated.

IOWA

Knoxville—Five hundred men have been thrown out of work by the closing of the Wapello Coal Co.'s mines at Knoxville. The mines will not be reopened. The company is controlled by the Chicago, Burlington & Quincy R.R., which can buy its coal cheaper in the open market than it can produce it in the Knoxville mine, according to officials.

FOREIGN NEWS

Copenhagen, Denmark—The American Arctic Coal Co. is reported as having sold its interest in the Spitzbergen Islands comprising 1,400,000,000 tons of unmined coal to a Norwegian Syndicate for $2,225,000.

PERSONALS

Robert G. Young, the chief master mechanic of the Lehigh Coal and Navigation Co. has been placed on the retired list with a pension for life.

Alex Maule, a prominent coal operator of Belleville, Ill., is in a serious condition at his home from injuries received in a fall down a flight of stairs.

J. M. Humphrey has been appointed chief engineer of the Lehigh Valley Coal Co. This is a new office. Mr. Humphrey has heretofore held the position of mining engineer.

D. B. Wentz, president of the Wentz companies, is recovering from an appendicitis operation at his home in Philadelphia. Mr. Wentz was stricken while in the South and was rushed to Philadelphia for medical attention.

J. Clark Evans has resigned his position with the Fairmont Mining Machinery Co. to accept a position with the Huntington Supply and Equipment Co., of Huntington, W. Va., taking a one-fourth interest in this concern.

Neil Robinson, of La Follette, Tenn., president of the La Follette Coal and Iron Co., who has been spending several weeks in Florida, recovering from a severe attack of heart trouble, has returned to La Follette, much improved in health.

James E. Roderick on Apr. 11 was appointed by Governor Brumbaugh for another four-year term as chief of the Department of Mines of Pennsylvania. This is Mr. Roderick's fifth reappointment, he having been at the head of the mines department since 1899.

R. C. Kerens, of St. Louis, has been elected president of the Board of Directors of the Coal and Coke Railroad Co., to succeed the late Henry Gassaway Davis. Arthur Lee, a son-in-law of the late Senator Davis, was made vice-president, and will be in active charge of the railroad.

H. S. Montz, heretofore division engineer of the Wyoming Division of the Lehigh Valley Coal Co., has been appointed mining engineer, while E. B. Wagner, heretofore assistant electrical engineer has been appointed electrical engineer of this firm in place of C. W. Beers resigned.

Percy C. Madeira, of the Madeira-Hill Co., has been elected president of the recently formed Anthracite Operators' Association. This is an organization of 54 companies who are generally spoken of in the trade as individual operators as distinguished from the larger operating concerns. The combined tonnage of the companies represented in the new society is about 13,000,000.

Attorney-General Brown, of Pennsylvania, on Apr. 10, appointed J. Paul MacElree, advisory counsel to the commission which will investigate the increase of the price of anthracite after the enactment of the anthracite coal tax. The selection of an attorney living in West Chester was made, it was said, because of the convenience to former Judge Robert S. Gawthrop, chairman of the commission.

R. W. Ropiequet, attorney of the St. Louis Coal Operators' Traffic Bureau, is recovering at his home in Belleville, Ill., from injuries he received a few days ago in a fall on the street at Chicago, where he had gone on business connected with the coal traffic bureau. He was overcome by vertigo and in falling his head struck the pavement. He did not regain consciousness until the following morning. He was then afflicted with a lapse of memory and was not able to recall what business had taken him to Chicago until he returned home and called in his secretary.

OBITUARY

James H. Doyle, superintendent of the Hallstead colliery of the Lackawanna company, died Apr. 9 at the family home, 225 Railroad Ave., Bellevue, Penn. Mr. Doyle was only 47 years of age and death came suddenly from a heart affection. He had been ailing since New Years, but no one thought that his condition was critical.

J. P. K. Miller, aged 59 years, chief engineer for the H. C. Frick Coke Co. died recently at his residence in Scottdale, Penn., after an illness of seven weeks. Mr. Miller had had charge of the engineering operations for all the Frick company interests in the Connellsville region, and was consulting engineer for the United States Steel Corporation's West Virginia mining operations, and was widely known among mining men throughout the country. Mr. Miller was born in Martinsburg, W. Va. He received only a common school education, but by self-application studied civil engineering. He located in Pittsburgh in business for himself, and devoted much time to the study of mining. Thirty years ago he located in Scottdale, becoming the chief engineer for the McClure Coke Co. This firm was merged with the H. C. Frick Coke Co. 20 years ago, and at that time Mr. Miller became chief engineer of the Frick Co. He is survived by his wife, mother, five sons and two daughters, also by three brothers and one sister.

INDUSTRIAL NEWS

Huntington, W. Va.—The Pittsburgh Coal Co. is building a river tipple on the Ohio at Huntington, and at the same time is negotiating leases in the New River field.

Taylorton, Sask.—The Western Dominion Collieries, Ltd., has awarded a contract to the Roberts & Schaefer Co., Chicago, for the installation of a coal tipple using a horizontal screen, at Taylorton.

Tompkinsville, N. Y.—The Mannesmann Light Co. of America, Inc., recently announced the removal of its factory and general offices to its new and enlarged plant at 16 Pike St., Tompkinsville, S. I., N. Y.

Birmingham, Ala.—The Sloss-Sheffield Steel and Iron Co. recently placed an order with the Roberts & Schaefer Co., Chicago, for some Stewart patent coal washing jigs for the washery at Birmingham, Ala.

Philadelphia, Penn.—February shipments of bituminous coal over the Philadelphia & Reading Ry. amounted to 1,696,357 tons, compared with 1,717,182 tons in January and 1,137,983 tons in February of last year.

Charleston, W. Va.—The Chesapeake & Ohio Railroad Co. is laying heavy steel on the whole of the Big Sandy branch of the road into the coal fields in order to facilitate the heavy coal tonnage now being produced.

Bay Village, Ohio—The Dover Coal and Supply Co. has been incorporated with a capital of $10,000 to mine and sell coal. The incorporators are H. F. Fraley, W. A. Hart, M. Schulz, Edwin F. Carran, E. W. Horning.

Haileyville, Tex.—The Texas Coal Co. was recently incorporated with a capital stock of $35,000. The incorporators are G. L. Blackford, Dennison, Tex., Thomas W. Clelland, of McAllister, Okla., Edward A. Elliott, of Haileyville.

Columbus, Ohio—The West Virginia Rail and River Coal Co. has been incorporated with a capital of $50,000 to mine and sell coal. The incorporators are S. F. L. Dean, H. H. Dean, John F. Carding, Earnest E. Hazelton, J. R. Elder.

Youngstown, Ohio—The refusal of an increase in wages from 36 to 45c. an hour resulted in a strike of 125 journeymen carpenters employed in construction work at the new by-product coke works of the Youngstown Sheet & Tube Co., Apr. 5.

Huntington, W. Va.—The Monti Coal Co. was recently incorporated to operate mines in Boone County. The authorized capital is $150,000 and the incorporators are Paul Hardy, R. P. Aleshire, A. J. Schropp, G. S. Brownley and Thomas W. Hardy, all of Huntington.

Ward, W. Va.—J. W. Dawson, general manager of the Kelleys Creek Colliery Co., is negotiating with the Pittsburgh Coal Co. for about 20 barges, several boats and yard facilities at either Cincinnati or Louisville with plans for entering the Ohio River Trade.

Philadelphia, Penn.—At the annual meeting of the Westmoreland Coal Co., Messrs. Lewis A. Riley, Edward Lowber Welsh and John Hampton Barnes were reëlected directors. At the meeting of the reorganized board, S. Pemberton Hutchinson was reëlected president, as were all the other executive officers.

Marshfield, Ore.—A stronger demand for coal in Portland and for shipping has been noticed and coal-mine operators are opening new mines to fill the demand. The Riverton Coal Co. is the latest one to start operations and this company has chartered several schooners to transport its product to market.

Russellton, Penn.—The Roberts & Schaefer Co., of Chicago, has just been awarded a contract by the Bessemer Coal and Coke Co., of Pittsburgh, for the building of a large Marcus patent steel mine tipple, using two Marcus screens, electrically operated, for immediate installation at the mine at Russellton, Penn. The contract price is $50,000.

Knoxville, Tenn.—The first quarterly meeting for this year of the Southern Appalachian Coal Operator's Association will be held at Knoxville, Tenn., Friday, Apr. 21. It will be preceded by the regular quarterly meeting of the Executive Committee of the Association in the morning in the rooms of the Association in the Holston National Bank Building.

Cambridge, Ohio—The Forsythe Coal Co. has purchased the holdings of the Imperial Coal Co. in the mine at Belle Valley, known as the Noble mine, and in the Derwent mine, at Derwent. The Belle Valley mine has been idle for about six months. It is the intention of the purchaser to operate both mines in the near future. New machinery will be installed.

Philadelphia, Penn.—Ship owners are experiencing great difficulty in getting crews for their vessels out of this port and only recently the "City of Augusta" with a cargo of coal for Havana was held here many days on account of a shortage of men. The owners were finally compelled to go to Baltimore to secure sufficient men to enable the vessel to be cleared.

Zanesville, Ohio—The Zanesville Coal Co. is preparing to open up valuable coal properties which it owns between Crooksville and McLuney in the near future, constructing tipples and other equipment. The property consists of about a square mile, and switches will be run from the Pennsylvania railroad. Coal is known to underlie the property in large quantities and is of good grade.

Elgin, Texas—A company is being organized here to develop the lignite beds found near Morgan Chapel. A tract of land has been purchased from W. H. Cartwright and several test shafts sunk. These have disclosed a thick vein of lignite of a quality said to be above the average for Texas. The company will place machinery for handling the lignite and will develop the mine to its fullest capacity.

Boston, Mass.—A new five-masted schooner, to be used mainly in the coal trade, is now under construction at Noank, Conn., for Fields S. Pendleton. She will have a carrying capacity of 3,000 tons, and is to be equipped with an oil-burning engine to be used when the sail power cannot be utilized. She has many unusual features in her construction as to the arrangement of the galley and crew quarters.

Richmond, Va.—Two new coal development companies were recently chartered, one the Buffalo Coal Co., of Crewe, Va., with $300,000 capital stock, and officers as follows: President, C. E. Wilson; vice-president, R. B. Wilson; secretary and treasurer, T. C. Berger. The second was the Mary-Helen Coal Corp., also of Crewe, Va., with $20,000 capital stock, the officers being the same as those for the Buffalo Coal Corp.

Buffalo, N. Y.—The Buffalo Fuel Co., Harry Yates, president, Marine Bank Building, will erect a coal dock and trestle on a site recently purchased, having a frontage of about 500 ft. on Buffalo River, with ample depth for switching from the Lake Shore and Delaware, Lackawanna & Western railroads. Modern coal-handling machinery will be installed for supplying coal to Lake steamers. The river channel has a depth of 23 ft.

Ramseytown, Penn.—The Kersey Mining Co. recently purchased 347 acres of Lower Freeport coal in Jefferson County, the property being located in Oliver Township between Ramseytown and Coolspring. An electric tramway has already been partly completed from Ramseytown to the tracks a distance of about 2 mi., and coal will be shipped from the Ramseytown tipple as this belongs to the same firm. It is estimated that 2,000,000 tons underlies this tract, and that from 10 to 15 years will be required to work it out.

Austin, Texas—The Texas Railroad Commission has authorized the Rio Grande & Eagle Pass R.R. to observe the following exception to the current demurrage and storage rules: "On coal, loaded on cars awaiting shipment, at points on the Rio Grande & Eagle Pass R.R., the demurrage charges assessed after expiration of regular free time shall be 50 cents per car per day." This exception is made because of the fact that shipments of coal are compelled to stand loaded on the tracks before moving to the border and into Mexico, because of the disturbed condition.

St. Louis, Mo.—A river celebration is to be held on the arrival, in a few days, of the first self-propelled steel barge of the Inland Navigation Co., which is to ply between St. Louis and New Orleans. City officials, members of the Business Men's League, representatives of civic organizations shippers and merchants will meet the barge on a steamboat and give it appropriate welcome. The barge which was built at Jeffersonville, Ind., is 240 ft. long and has a capacity of 1,600 tons. It is equipped with four 80-hp. engines. The company is building a fleet to restore river traffic between St. Louis and New Orleans and will later put barges on the upper river.

Harrisburg, Penn.—Notwithstanding a claim by the Philadelphia & Reading Coal and Iron Co., alleging that Frank Polwicz, of Silver Creek, died from natural causes, including miners' asthma and dilation of the heart, Referee Houck, of the State Compensation Bureau, has awarded the widow and children of Polwicz $1,800 damages and funeral expenses. Polwicz was injured at the Silver Creek colliery by being struck by a steel beam and died several days afterward. Both the claimant and the company relied on the testimony of the same physician, Dr. W. N. Stein, who stated that Polwicz suffered from injuries received at the colliery, but in all probability death resulted from natural causes.

St. Louis, Mo.—The retail price of soft coal was advanced 10c. a ton on Apr. 1 on the strength of a notification from the operators that their price to the retailers would be advanced 10c. a ton on account of the new wage scale. The operators, in a circular letter, explain that, although the wage increase is only 6c. a ton, the advance in the price of explosives adds another cent and the advance in the cost of other materials and supplies, rails, steel, copper, lumber, lubricants, cement, repair parts and general supplies adds 3c. more per ton. The 6c. wage advance is divided, according to the circular, into 3c. for "diggers," 2c. for additional men on daily wage and 1c. for men doing yardage and "deficiency" work.

Toronto, Canada—Mark Workman, president of the Dominion Steel Corporation, who has returned to Montreal from a visit of inspection to the company's plants at Sydney, N. S., states that the coal business has been seriously hampered by heavy enlistments of miners and by commandeering of the company's steamships. Six of the largest vessels were taken by the British admiralty last fall, and unless these are replaced on the opening of navigation the coal business will be seriously crippled and the economic conditions of the whole country affected. As regards the shortage of labor he pointed out that when it was found that recruiting was curtailing the coal output in Wales, the British government had intervened and stopped miners from enlisting, and he thought it was about time that recruiting among Cape Breton miners was discontinued. The company is now operating 17 collieries most of which are equipped with the most modern machinery and an additional mine will shortly be opened.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of Coal Age, published weekly at New York, N. Y., for April 1, 1916.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Chester W. Dibble, who, having been duly sworn according to law, deposes and says that he is the Vice-President of Hill Publishing Co., publisher of Coal Age, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Hill Publishing Company, 10th Ave. at 36th St., New York, N. Y.
Editor, Floyd W. Parsons, 10th Ave. at 36th St., New York, N. Y.
Managing Editor, Floyd W. Parsons, 10th Ave. at 36th St., New York, N. Y.
Business Manager, Joseph E. Sample, 10th Ave. at 36th St., New York, N. Y.

2. That the owners are:

Hill Publishing Company, 10th Ave. at 36th St., New York, N. Y.
Owners of 1% or more of Stock Issued.
Estate of John A. Hill, 10th Ave. at 36th St., New York.
Arthur J. Baldwin, 10th Ave. at 36th St., New York.
Fred R. Low, 10th Ave. at 36th St., New York, N. Y.
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Alfred E. Kornfeld, 10th Ave. at 36th St., New York, N. Y.
Emma B. Hill, 80 Munn Ave., East Orange, N. J.

The balance of the stock issued (less than 1% each) is owned by 68 employees, 3 ex-employees, and 13 others who are wives, daughters or relatives of employees.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages or other securities are: Mortgage on building, Dime Savings Bank, Brooklyn, N. Y.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

CHESTER W. DIBBLE.
Vice-President Hill Publishing Co.

Sworn to and subscribed before me this 31st day of March, 1916.

[Seal.] RICHARD L. MURPHY.
(My commission expires March 30, 1917.)

Market Department

General Review

Definite relapse in the anthracite market and companies go on short working schedules. Bituminous continues irregular. Movement under way to the Lakes but opening of navigation much delayed. Middle west notably easier and output heavily curtailed.

Anthracite—The labor and price uncertainties in the hard-coal industry have upset the trade completely, delayed buying, and turned what is usually one of the most active months of the year into one of the dullest. Orders on hand are at the minimum for a long time, and a number of the big companies, including some of the individuals, were obliged to suspend operations this week for the first time this season; there are also rumors that a general suspension of operations may be put into effect over a seven-day period in order to give the market an opportunity to right itself. The situation at down East points continues as acute as ever, and it is evident that the question of supplies in that territory the coming season will be a serious problem. As was expected the March shipments of the hard-coalers was very heavy, being the third largest in the history of the industry for that month.

Bituminous—The market continues to vary, according to transportation conditions and supplies are still short at the more remote districts; consuming interests at such points find it impossible to accumulate any surpluses, and a little extra demand would undoubtedly force prices up. Expiration of current contracts, and delays in negotiating new ones is also causing more buying in the prompt market. At points more contiguous to the mining districts, supplies are plentiful and shippers are receiving instructions to hold up orders or cancel them entirely. The chief constructive factor in these markets is the undoubted fact that there is a tremendous paucity of supplies in those districts where embargoes have been in effect.

Exports—Supplies at loading ports are somewhat above normal, and although there has been a relatively heavy movement in the offshore trade, it has not been up to expectations. Aside from a moderate easing off in rates to the Plate, due to certain special conditions of a temporary nature, ocean freights have scored still further advances and there is no indication that the top has yet been reached. Sailing vessels continue an important factor in this trade, especially to South American ports.

Lake Trade—The disappointment over the late opening of the Lake shipping season has been offset in a measure by the lifting of some important embargoes that will release a considerable tonnage. The difficulties in reaching an agreement on the Pennsylvania wage scale also tended to stiffen up the market. Considerable coal has already arrived at the Lake shipping ports in spite of fears that the inadequate transportation facilities would delay the movement. However shipping will be unusually late in beginning as there are exceptionally large quantities of extra heavy ice. Boats are already being loaded, and when shipping is finally opened coal will be rushed forward with the utmost dispatch as considerable anxiety is developing at the upper ports over the scarcity of supplies. With the current situation generally dull, agencies are concentrating attention on contracts.

Middlewest—The market is notably easier, particularly on Eastern coals, some of which have sold at heavy sacrifices in order to avoid demurrage. Spot prices generally are showing a distinctly weakening tendency although the curtailment program now in effect should check this. It is conservatively estimated that not more than one-third of the Illinois and Indiana mines will be in operation during the current month, and the output will probably be only about half that for the same period last year. Interest now centers principally on contracts on which shippers are canvassing aggressively, and the buyers seem less adverse to meeting the higher prices than in the beginning.

A Year Ago—Anthracite trade active in all departments. Improved sentiment in bituminous though movement continues light. Less tendency to force the market, and contract prices are fair. Unfavorable outlook in lake trade a depressing feature.

Business Opinions

Boston News Bureau—Uncertainty is the dominating influence in the situation today. News from Washington is of a character that fails to satisfy. Foreign business continues large and the profits corralled in this direction have increased the buying power in domestic trade.

Looking ahead, however, people are much at sea. There is a natural tendency to go slow in increasing stocks of merchandise beyond actual wants, because of the unusual high level of prices. But the wants keep coming and will come so long as the war lasts.

Iron Age—There is the same urgent demand upon the mills for the delivery of steel, a good deal of it overdue, but the market is less feverish and new buying is lighter. Manufacturing consumers are covered for some months ahead and the fear of not being able to get material for their operations in the second half of the year is less a factor. The large increase shown in the Steel Corporation's unfilled orders points to a continuance of the present strain for a good many months—that in the main is the judgment of the trade, and there is little attempt to appraise the factors in the advance from 8,569,000 tons of orders on Feb. 29 to 9,331,000 on Mar. 31. The heavy March rail orders are generally thought of, but it is not known what part of them is included. A certain amount of possible steel consumption is being cut off by high prices, but apart from smaller buying of wire products the ultimate consumer has scarcely been heard from, and steel manufacturers have been too much driven to give heed to special appeals like that of the implement manufacturers.

Bradstreet—Activity reigns supreme in whatever direction one may look—whether to trade, industry, mining, railroading or shipping by water—and a further surge forward is expected when ice-closed harbors open to navigation and country roads improve. The pace is rapid, at a record rate, in fact, being neither deterred by high prices nor misgivings over international matters. The only existing drawbacks to final distribution, cold weather and bad roads, are deemed to be but temporary factors. Whatever lulls may be experienced are due either to inability to get goods or to the fact that the producing units of the country are sold up, with perhaps some slight easing in this or that line as the result of seasonal changes.

Dun—Even after months of extensive buying, requirements continue remarkably heavy and further augmentation of business is noted. Consumptive demands are sustained in greater volume than in best previous years and pressure upon industrial forces is unabated, though in some instances high prices check new contracts. But such cases are still the exception and, in the aggregate, transactions grow rather than diminish, being limited mainly by the oversold condition of mills and factories. Commercial failures this week in the United States, are 342 against 381 last week, 380 the preceding week and 473 the corresponding week last year.

American Wool and Cotton Reporter—The week under review has been quiet but firm in the Boston wool market. It is a "tremendously sound situation," as one dealer put it. In the woolen and worsted goods market prices advanced during the week. The outlook is for still higher prices and for a continued well sold mill condition. Reorders are likely to be taken at much higher prices than the initial orders.

Dry Goods Economist—Many retailers report an unusually large business and this even where the weather has been unfavorable to the distribution of dry goods. Not only are consumers buying freely, but they are buying a better class of merchandise. This should be encouraging to those retailers who, in spite of the real necessity for so doing, hesitate to ask higher prices than those to which their public has become accustomed. All along the line the price tendency continues to be upward and many manufacturers experience difficulty in delivering goods.

Marshall Field & Co.—Current wholesale distribution of dry goods shows a handsome increase over the corresponding period of a year ago. Road sales for both immediate and future delivery continue to run well ahead of last year. Merchants have been in the market in much larger numbers and report a good current business on all lines. Collections are normal. Prices are firm.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River unchanged. Light spot market f.o.b. but good demand in New England for inland delivery. Georges Creek shipments slow. Pennsylvania grades still unsettled by labor uncertainties. Anthracite deliveries much in arrears.

Bituminous—Prices on Pocahontas and New River continue easy at Hampton Roads. $2.70 is quoted for spot coal in some instances, but quotations on most of it continue to range from $2.75 to $2.85. Contract demand is strong in this territory but with the slow movement both coastwise and by rail from tide-water distributing points in New England the steam user has practically no chance to accumulate coal. Stocks are therefore very light and it would take only a small extra demand to bid up prices for spot coal at this end. There are so few vessels and barges open to charter that only small quantities of West Virginia coals are coming forward "on consignment." Actual cost is so high that such ventures are still speculative. Mild seasonable weather may give quite a different tone to the market.

For small lots, coal on cars at points like Providence and Boston is in good request. On such business $3 is named as the base price at Hampton Roads plus $2.50 for freight and discharge, making $5.50 the average close price on cars Boston. A number of plants are being forced into the market through the expiration of old contracts, and others are obliged to buy because of embargoes against all-rail deliveries. On the other hand, the factors who have free coal are not inclined to sell except for prompt shipment. Practically no prices are now being made for delivery through the season. The City of Boston for its harbor institutions received bids from only two shippers, and one of the latter submitted figures for but one plant out of six. The lowest price named for season delivery was $5.51 alongside.

The situation on the Pennsylvania grades is not clearing up as soon as was expected. No pronounced advance over last week's prices can be reported, although the market now is somewhat more even. There is still some anxiety over the outcome. The eccentricities of the railroads hauling coal to New England has caused many consumers within reasonable rates from tide-water to buy such Pocahontas and New River as can be had. On the other hand, the high marine freights on the latter coals is developing an increased demand for the Pennsylvania grades for New York loading. Already some high season prices have been paid, although by far the most of the advance over prices on similar coals last year is due to dollar freights from New York as against 45@50c. a year ago.

Anthracite—Receipts of domestic sizes are most discouraging. All of the shipping companies have more New England orders on file than they can possibly ship for months to come. Some of the dealers who a few weeks ago were trying to decide whether they would "load up" at the present winter circular are realizing now that it is more a question of being able to get coal enough for current business. There are all kinds of rumors about the labor controversy but so far they have not reached the general public; at least not to the extent of causing a rush of orders to the retailers. Meanwhile the latter are trying hard to keep abreast of the current demand.

The slow movement of anthracite all-rail tends to increase the demand for water shipments. From present indications the distribution of anthracite this year in this territory is going to be a problem.

Bituminous prices, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.75@3.20	$3.10@3.50	.....	$1.50@1.95
Cambrias and Somersets	3.00@3.45	3.30@3.75	.....	1.60@2.10
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	$2.00

Pocahontas and New River are quoted at $2.75@2.85, f.o.b. Norfolk and Newport News, Va., and on cars at Boston $5.50@5.75, Providence 25c. less.

NEW YORK

Anthracite buying slow but prices held firm except in odd cases where individuals shade a trifle. Dealers holding back on bituminous. Much depends on outcome of wage conferences. Prices low.

Anthracite—Milder weather has resulted in a falling off in demand and dealers are not placing orders. There is an impression among some dealers that the companies will announce a reduction of probably 15c. a ton on prepared sizes about May 1, but so far no official statement has been issued. Production, while not near to capacity, is sufficient for immediate needs. Labor is short.

There is plenty of coal at Tidewater to meet all demands but prices for prepared sizes are firm except where individuals are anxious to dispose of a lot, when there is a shading of about 10c. a ton. A reaction has taken place in the steam coals, which are now selling at or near circular. Many dealers believe the market on these coals is now down to a summer basis.

Current quotations at Tidewater, lower ports, gross tons, f.o.b., follow:

	Circular	Individual		Circular	Individual
Broken	$5.05	.....	Pea	$3.50	$3.25@3.50
Egg	5.30	$5.30@5.30	Buck	2.75	2.60@2.85
Stove	5.30	5.30@5.30	Rice	2.25	2.05@2.25
Nut	5.55	5.55@5.55	Barley	1.75	1.75@2.15

Quotations at the upper ports are generally 5c. higher owing to the difference in water freight rates.

Bituminous—The bituminous market is inactive. Dealers who have plenty of coal are not anxious to sell and are looking for buyers only when it is necessary to unload cars to save demurrage charges. Many dealers are short of supply but are holding back in the hopes of obtaining bargains. At times it is difficult to get any of the better grades, shippers holding these grades for contracts. There is a feeling of uncertainty among the trade and much depends upon the outcome of the Philadelphia wage conference.

The local ports are practically free of embargoes and shipments are freer. Much coal has been sent to New England water points, but complaint is heard of the delay in unloading. All-rail shipments to New England are still tied up. There is plenty of free coal at Tidewater to meet all demands. Mine quotations show a greater variation, much depending upon the road over which shipments are made.

A few of the large contracts remain open, some buyers continuing to hold off expecting better prices.

Quotations on various grades, gross tons, f.o.b., follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.60	$3.50@3.60	$3.50@3.60	$1.95@2.05
Georges Creek Tyson	3.35@3.50	3.35@3.50	3.35@3.50	1.80@1.95
Clearfield: Medium	3.10@3.20	3.10@3.20	.....	1.55@1.65
South Forks	3.25@3.50	.....	.....	1.70@1.95
Nanty Glo	3.10@3.20	.....	.....	1.55@1.65
Somerset County: Medium	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Quemahoning	.....	3.10@3.30	3.10@3.30	1.55@1.75
West Virginia Fairmont ¾	.....	2.75@2.85	2.75@2.85	1.00@1.10
Fairmont mine run	.....	2.75@2.85	2.75@2.85	1.00@1.10
Western Maryland	.....	3.00@3.10	3.00@3.10	1.45@1.55

PHILADELPHIA

Anthracite mines on short time. Little demand for coal. Cut prices send broken coal back to contract figure. Bituminous slow with prices stationary, but increase expected. Some contracting.

Anthracite—April, usually one of the four busiest months of the year, is in a bad slump, with little indications of improvement. Notice of an agreement on the wage scale would cause business to open up with a boom, as retail consumers are anxious to buy coal, in accordance with their usual custom this month. Many retailers are putting coal in customers cellars at the winter circular but with the understanding that if a reduction of 50c. is made they will give their customers the benefit. It is generally accepted that when an agreement is signed with the miners they will get an increase in pay, with a consequent increase in the retail price of coal.

Even under these conditions there is very little business moving, and the orders on the books of the shippers are less now than last week. The Susquehanna, Lehigh Coal and Navigation, and the Philadelphia & Reading Coal and Iron Co., and a number of the individual operators, were compelled to close down their mines the first few days of this week. And even with this short working time there is an overproduction and several of the companies have quite a number of cars accumulating demurrage which they may ultimately be compelled to put into storage. It would occasion no surprise if the companies should decide to close down for an entire week.

Several of the companies who had been supplying their furnace consumers with broken coal for the first three months of the year at a price of $3.35 on contract, are now asking the circular price of $3.60. Usually the demand exceeds the supply of this size, as it is only produced in sufficient volume to meet orders in hand. At the new price many cancelations were received and the companies found themselves with a good quantity on their hands on account of the individuals stepping in and taking the business at lower figures. Later the companies adjusted the price of this size to the old figures.

It is believed that the individuals who will be compelled to work their mines to fill certain contracts will have more or less cut price coal to offer up to the time the new agreement is signed. Pea coal, of course, continues in demand at full price. The steam sizes are in slightly less demand, but there is no doubt that curtailment in the working time at the collieries will keep most of the fresh-mined fuel at the mines for steam use, which will tend to increase the demand for these grades.

The prices f.o.b. cars at mines per gross ton for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.85	Pea	$2.55	$3.30
Egg	3.85	5.10	Buckwheat	1.55	2.30
Stove	4.10	5.10	Rice	.90	1.80
Chestnut	4.25	5.35	Barley	.55	1.30

Bituminous—The market continues so well supplied that many shippers are receiving requests to hold orders or are having them canceled entirely. The consumers are convinced that the operators will grant concessions to the miners in the Central district, and that there will be no further difficulty, though most of the shippers are far from holding this view. Under such conditions it has been difficult to maintain prices on last week's basis, though there has been few concessions on any of the grades. This stability is largely due to the fact that the territory to the north and east has been practically swept bare of fuel on account of the embargoes, and the moment the railroads take off the restrictions there will be a big tonnage rushed to those points with a consequent stiffening of the prices.

The prices per gross ton f.o.b. cars at mines rule about as follows this week:

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.50@1.60
South Fork Miller Vein	1.70@1.80	Fairmont gas, mine-run	1.35@1.45
Clearfield (ordinary)	1.50@1.60	Fairmont gas, slack	1.05@1.10
Somerset (ordinary)	1.35@1.45	Fairmont lump, ordinary	1.30@1.35
West Va. Freeport	1.30@1.35	Fairmont mine-run	1.15@1.25
		Fairmont slack	1.05@1.10

BALTIMORE

Bituminous business light, many still buying from hand to mouth. Export prospects better.

The chill and snow of last week caused many small orders for hard coal, but otherwise there is no marked activity, and many consumers are holding off for developments.

Bituminous demand is light, most consumers still purchasing from hand to mouth. Buyers are averse to contracting at prices 20 to 40c. above current figures. An example is had in the recent refusal by the city government of bids on 42,500 tons of bituminous for a year's delivery, and the purchase the present week of 2,325 tons in the open market.

The export situation is improving, seven charters being announced here the past week, the greatest number for a long time past. During the week a total of 13,207 tons was loaded here for export.

Bituminous prices to the trade, both for export and inside the capes delivery underwent no great change, although gas coals are a little weaker. Prices are about as follows: Georges Creek Tyson, $1.65; Miller Vein, $1.40; Quemahoning, $1.50; Somerset, $1.30; Freeport, $1.20; Fairmont gas, three-quarter, 85@90c.; same, mine-run, 85c., and slack, 80@85c.

HAMPTON ROADS

Vessels delayed and movement lighter than anticipated. Abnormal accumulation at the piers.

Although there has been a fair movement from Hampton Roads it has not been as heavy as was anticipated. On account of weather conditions a number of vessels have been delayed in arriving. The coastwise movement has been heaviest to Boston and Providence with other cargoes to practically all of the New England ports and to Baltimore and Jacksonville.

Circular prices are still being quoted but coal is being sold somewhat below these and the market on New River and Pocahontas is about $2.80 or $2.85. There is a little above the average supply of coal on hand but a considerable amount of this is being held for vessel tonnage over due.

The demand for vessels is still good and in consequence rates are high and sailing vessels are still being loaded in considerable numbers with export cargoes; these are principally for Brazilian ports although one schooner was loaded with 4,000 tons for Buenos Aires.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Mar. 11	Mar. 18	Mar. 25	Apr. 1	Apr. 8
Norfolk & Western	126,540	142,223	165,608	145,941	144,562
Chesapeake & Ohio	75,525	60 412	90,095	98,495	90,981
Virginian	68,598	104,810	103,055	65,026	74,198
Totals	269,663	307,445	359,758	309,462	309,741

Ocean Charters and Freights

VESSEL CLEARANCES

The following steamers have cleared from various ports during the past week:

NORFOLK

Vessel	Destination	Tons
Adela Accame[12]	Genoa	4,473
Bacchus[13]	Buenos Aires	3,500
Josefa Raich[13]	Havana	3,400
Mossoro[1]	Pernambuco	1,767
Ocland[6]	Curacao	5,500
Caroline Gray[5]	Cienfuegos	418
H. O. Barrett[2]	San Juan	2,540
M. E. Barrett[2]	Rio de Janeiro	2,498
Soperga[12]	Italian Port	Part cargo
Imperator[6]	Manzanillo	1,081
Harwood Palmer	Buenos Aires	4,000
Santa Cecelia[3]	Buenos Aires	
Guajara[13]	Pernambuco	953
Australia[12]	Savona	2,099
Wimborne[10]	Genoa	9,000
Ed. E. Briry[2]	San Juan	2,000
Gov. Powers[13]	Pernambuco	2,472
Zvir[13]	Spezia	
O. J. Olson[2]	Havana	
Luiginia Accame[12]	Porto Ferrajo	

NEWPORT NEWS

Vessel	Destination	Tons
P. H. Crowell[4]	Rio de Janeiro	3,982
Victor[4]	Sagua La Grand	1,064
Santa Theresa[4]	Havana	3,094
Selene[14]	Bermuda	5,260
Vitalia[4]	Santiago	1,500
Esther Ann[7]	Brazil	1,104
Nordstjernen[4]		3,572
Asgard[4]		1,800
A. W. Snow[15]	Pointe Pitre	

PHILADELPHIA

City of Augusta	Cay Francis	514
Moldegaard	Havana	
A. A. Raven	Santos	

BALTIMORE

Arborean	Argentina	7,990
Absolom	Costa Rica	3,060
Clinchfield	Cuba	2,157

[1] Atwater & Co. [2] Baker Whiteley [3] Barber & Co. [4] Berwind-White [5] C. G. Blake Co. [6] Castner, Curran & Bullitt [7] Chesapeake & Ohio C. & C. Co. [8] Crozer-Pocahontas Co. [9] Hasler Brothers [10] Flat Top Fuel Co. [11] New River Coal Co. [12] Pocahontas Fuel Co. [13] Smokeless Fuel Co. [14] C. H. Sprague & Son [15] White Oak Coal Co.

OCEAN CHARTERS

The following coal charters have been reported from various sources during the past week:

BALTIMORE

Vessel	Destination	Tons	Rate
Absalon	Port Limon	1,353	
Mundale	Havana	2,072	
Claveresk	Felton	2,441	
Lydia McClellan Baxter		1,153	
Robert P. Murphy	Rio Grande do Sul	572	$23.00
Graafaxe	Port Limon	976	
Aeon	Greece	1,650	
Penobscot	Cuba	1,666	
Clinchfield	Nipe Bay, Cuba	1,146	
Lord Derby[3]	Guayaquil	2,401	
Maipo[4]	Valparaiso	3,186	
C. A. Davenport	Buenos Aires	1,157	

ATLANTIC RANGE

Saba	Buenos Aires	2,687	24.60
J. V. Nassau	Rio Plate	2,081	

VIRGINIA

Vessel	Destination	Tons	Rate
Ilford	Port Militar	2,713	
Governor Powers	Pernambuco	1,578	$19.00
Valetta[1]	River Plata	3,721	22.80
Ella M. Willey	Para	735	[2]15.00
Belmont	Buenos Aires		19.00

PHILADELPHIA

Dustin G. Cressy	Para	726[3]	15.00
Victor C. Records	Jucaro	450	7.00
Florence Creadick	Cardenas	657	

[1] May. [2] About. [3] Baltimore or Virginia. [4] With coke.

OCEAN FREIGHTS

The freight market has again advanced to all destinations, except to the Plate which is the only weak spot in the market today. A steamer of 8,000 tons capacity, was recently chartered from Virginia or Baltimore to a Lower Plate port at $22.80 per ton, with 1,000 tons per day discharge, May loading, and these terms can no doubt be shaded.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.75@5.00	Bermuda	$5.00@6.00
Cardenas or Sagua	6.25 about	Vera Cruz	7.00@8.00
Cienfuegos	6.00@6.50	Tampico	7.00@8.00
Port au Spain, Trinidad	7.50@8.00	Rio Janeiro	[4]19.50 about
St. Lucia	7.50@8.00	Santos*	[4]19.50 about
St. Thomas	7.00@7.25	Montevideo	[4]22.80 about
Barbados	7.50@8.00	BuenosAires orLa Plata	[4]22.80 about
Kingston	6.50 about	Rosario	[2]25.20@26.40
Curacao	7.00@7.25[3]	West Coast of Italy	31.20@33.60
Santiago	6.25@6.50[6]	Barcelona[5]	**27.60@30.00
Guantanamo	6.25@6.50[6]	Valparaiso or Callao	17.00 about
Demerara		Marseilles	30.00@32.40

* Consignees paying dockage dues. ** Spanish dues for account of cargo.

[1] 750 tons discharge, possibly 500 tons. [2] 500 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port. [6] 300 tons discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

Several yearly charters were made last week, mostly barges, at a flat rate of $2 per ton to Providence from Hampton Roads. There can no longer be any doubt that coastwise freights will rule high throughout 1916. Current rates are $2@2.25 to Providence and New Bedford and $2.25@2.50 to Boston.

Barge freights from New York to Long Island Sound continue at a dollar flat, with plenty of orders and no surplus of boats. Warm weather will soon make a difference, however, in the demand for anthracite in New York City itself.

LAKE MARKETS

PITTSBURGH

Railroad situation regarded greatly improved. Actual market slightly better, with sentiment much more hopeful.

The welcome news is out that the Pennsylvania and the New York, New Haven & Hartford have lifted nearly all their embargoes against shipments east and into New England, and a decidedly more hopeful tone pervades the Pittsburgh district. While the past three months have been characterized by embargoes going on and off almost overnight the embargoes now lifted are in great part of long standing, and it is concluded therefore that there is a decided improvement in the general railroad situation. The wage difficulty in the central Pennsylvania district has also operated to stiffen the local market somewhat. There is, however, no particularly great demand for prompt coal, and the dissipation of hopes that there would be an early opening to the Lake shipping season has not been a favorable factor in the past week. It is pointed out, however, that whatever delay occurs, as compared with expectations recently entertained, will make the movement of coal heavier when it does come, and thus the local market may be reported as improved slightly physically and improved greatly sentimentally.

The closing of contracts for the twelvemonth proceeds at a slow rate. We quote prompt coal as follows, Youghiogheny gas bringing measurably higher prices than Monongahela steam: Slack, $1.10@1.15, mine-run, $1.05@1.25; ¾-in., $1.25@1.40; 1¼-in., $1.35@1.50, per net ton at mine, Pittsburgh district.

BUFFALO

Anthracite very quiet because of uncertainty of prices and bituminous, the same due to plentiful supplies. Car situation improved only in spots. Loading Lake coal progresses.

Bituminous—There appears to be a heavy consumption everywhere, but consumers are not buying and prices are weaker. A more or less general suspension was expected and now that it has not taken place there is no market. The disappearance of the snow has not helped rail operations much and considerable time will be needed to get the accumulated freight out of the way.

Bituminous prices are not as strong as they were, but Pittsburgh is reported to be as confident as ever and continues to send out former prices for Buffalo, which are as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—Sales are about as light as they ever have been at this time of the year. Orders for future consumption are held up to wait for a possible price reduction, though that is not now expected for this month. Canada is still buying slowly. The trade is about as badly upset as it possibly could be. Meanwhile Buffalo is getting a large share of the surplus anthracite that neither the mines nor the agencies can sell. All the Lake trestles are active, with a large tonnage chartered. At the same time freezing weather all along the Lakes insures a very late opening.

COLUMBUS

Practically all Ohio mines closed and the coal trade is quiet. Some activity in contracting.

With practically all mines closed the production is almost negligible and the sales departments have had very little to do. However, the tone of the market remains good and it is generally believed that future prospects are bright. Producers as well as shippers are playing a waiting game at this time.

Retailers' stocks are quite low and prices have ruled firm all along the line. Dealers are making an effort to "clean up" to prepare for the stocking-up season. There is a good demand for Pocahontas and prices are steady at the April circular. Anthracite is also moving fairly well.

Steam business is now at a standstill as most operators and jobbers are loath to contract before the wage scale is settled. Sales managers, however, are busy looking over the situation and with the wage scales finally adjusted there will be a rush of contracting. Prices on new contracts are generally higher than a year ago. Railroads are using quite a tonnage, but this is mostly surplus stocks.

Preparations are being made for an active Lake trade as there is a good demand from the Northwest. It is believed that navigation will be formally opened Apr. 25. Shipping of Lake coal will start as soon as the mining scales are adjusted.

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.50	$1.60	.....	Mine-run	$1.15	$1.20	$1.15
Inch and a quarter	1.40	1.40	$1.40	Nut, pea and slack	1.00	1.00	.95
Three-quarter-inch	1.35	1.35	1.30	Coarse slack	.90	.90	.85
Nut	1.25	1.25	.....				

DETROIT

Steam-coal inquiries are numerous but orders are light. Little domestic stock is being sold. Opening of navigation is expected to bring improvement.

Bituminous—Steam coal is not in active demand, although wholesale dealers are receiving a larger number of inquiries. Orders are of small amount. Consumers appear reluctant to purchase more than a few days' supply at a time. Fine coals continue in better demand than large sizes.

Domestic grades are flat. Consignment coal is still plentiful in Detroit. Sales at prices below schedule are reported occasionally but not often enough to constitute an unsteadying influence.

Anthracite—Consumers have decided the season for replenishing anthracite stocks has passed and the buying is on a small scale. Most of the local shippers are continuing the March prices in effect.

Lake Trade—Unusually heavy ice in large quantities has delayed the opening of navigation on the Lakes. Shippers are anxious for the boats to start for the upper Lake ports, where supplies have run very low; this will also cause a reduction in the amount of consignment coal shipped into Detroit.

TOLEDO

Vessel shortage feared by shippers. Plenty of Lake coal in Toledo.

There is considerable coal here, notwithstanding fears that insufficient cars could not be secured to bring enough coal into this market to take care of early navigation demands. Boats are already being loaded, although there is not much prospect of a start for some time yet. A shortage of boats is expected, due to the extremely heavy demand for boats for grain carrying. Grain shippers who were last year paying ⅞c. per bu. are now offering as high as 5c. a bushel and may go still higher.

CINCINNATI

Cool weather created some domestic buying. Nut and slack continues strong and contracting active.

The continued scarcity of nut and slack remains the outstanding feature of the market. The movement to the Lakes is beginning to start up which means an increased production of screenings. The Lake trade is slow opening up, due to the backward season, but ample stocks are being accumulated at the docks, judging by the rail movement through here and the information of the operators on the subject. The trade is looking for a good spring season.

COKE

CONNELLSVILLE

Additional furnace-coke contracts. Spot market easier, with some suspensions on contracts. Production and shipments make new records.

Additional contracts for Connellsville furnace coke for second-half shipment have been closed since last report. Three interests, two of them at least being steel interests, have closed for a total of 25,000 tons a month, at $3, there being two sellers, one of them a merchant interest which operates in pig iron and steel as well as coke and presumably took iron or steel in payment for the coke. In such a market, however, a trade deal should involve fully as high a price for coke as a cash transaction. Contracts previously reported on this movement were at $2.50 and $3 respectively. The contract market is not particularly active, though some additional negotiations are in progress. Spot coke is easier, but the best known brands are held as high as formerly.

With better weather and the removal of danger of restricted shipments some of the furnace interests have instituted suspensions of shipment on contract, evidently desiring to work off accumulations held against possible contingencies, and with production heavier than ever the coke market is easy except for the conservative note injected by the fear of distinct labor shortages. We quote: Spot furnace.

$2.75@3; contract furnace, $2.50@3; spot foundry, $3.75@4; contract foundry, $3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 1 at 476,995 tons, an increase of 17,527 tons, and shipments at 476,924 tons, an increase of 20,587 tons. Both production and shipments made new records for this movement.

Buffalo, N. Y.—The demand is fair and would have been sufficient to keep prices up but some overproduction and a temporary shutting down for repairs of some furnaces caused a decline of about 50c. Shippers generally consider prices to have been too high, for which reason it was easy to reduce them. Quotations are down to $5.50 for foundry, $4.50 for furnace and $3.95 for high-sulphur. The demand is expected to improve, but production is naturally too large and only a light car supply can give the market any real strength.

Chicago—The new April prices of $4.50 for domestic egg, stove and nut are fairly firm, although demand has softened somewhat. Gas-house coke is strong at $4.60; Connellsville is slightly easier, and byproduct foundry is in excellent demand at firm figures. Quotations per net ton, f.o.b. cars Chicago, are as follows: Connellsville, $6.50; Wise County, $6.25 to $6.50; byproduct foundry, $6.25 to $6.50; byproduct domestic, $4.50; gas house, $4.50 to $4.60.

MIDDLE WESTERN

GENERAL REVIEW

Sluggish conditions prevail though there is considerable contracting. Screenings the most active feature. Eastern coal spotty.

Steam coals are still in demand, the call being mostly for screenings which are firm. A large number of operations now divide their limited production between steam lump and screenings, for which the demand is well maintained though conditions are otherwise dull. Domestic orders are small as retailers seemingly take no action to replenish stocks. Specuative smokeless coal in Western territory has resulted in some shippers being obliged to sacrifice tonnage at extremely low prices in order to avoid demurrage. The upper Lake dock companies are making an effort to hold out against the new circular prices on smokeless.

Spot coal is becoming more plentiful, and indications point to irregular prices for spot coal if tonnage increases, though this seems unlikely now that production is being curtailed. There is every likelihood that the Indiana and Illinois output for April will be much below the same month last year, in some instances showing a 50% decrease. It is estimated that at least two-thirds of the mines of these states have closed down for the month of April owing to lack of orders. Immediate requirements such as contract obligations and current orders from retailers are filled by storage coal already loaded in cars on tracks at the mines, or from production of isolated operations where orders are centralized.

There being so little current business available, attention is concentrated on contracts. Shippers and wholesalers are canvassing vigorously for business and the larger consumers such as railroads and industrial plants are not so averse to the higher prices, now that wages are to be increased.

CHICAGO

Market soft except on screenings. Contracting at new circular prices in evidence. Screenings prices slightly stronger.

The depression of the past two weeks is still in effect. Steam users are consuming storage coal, which has largely curtailed further shipments. New prices effective Apr. 1 are well maintained. Some railroad coal is being shipped from Williamson County, but in Franklin County the mines have been mostly all idle.

Steam business is the principal factor in the Springfield district, and otherwise extreme dullness prevails. Most of the mines have been shut down for at least a month's time and will not open until there is a revival in trade.

The volume of Indiana steam business continues fair. Industrial conditions are such that the demand for steam sizes will be maintained throughout the spring and summer, particularly since there is considerable new activity. Prices for Indiana coal have not been maintained at the high mark anticipated, due to over-production. Domestic trade has weakened greatly. Genuine spring weather has eased off retail buying 75%. A number of mines have closed down for the month of April to make repairs.

Considerable smokeless tonnage has been undergoing demurrage this week on account of the unwillingness of shippers to cut prices to afford disposition. Mine-run is more brisk, bringing around $1.35. Contracting is active at the new prices established.

Kentucky grades are heavy, and much unsold coal has accumulated. Miller's Creek block ranges from $1.75 to $1.90, while other lump is averaging from $1.35 to $1.60. It is hoped that lake business will soon bring relief to the Kentucky operators. Egg is very slow and the demand for lump quiet. Kanawha splint coal and Hocking coals are weak, with prices on splint lump averaging from $1.30 to $1.50; Hocking 1¼-in. lump from $1.50 to $1.60.

With the announcement of a continuation of the winter circular on anthracite the demand melted away. Unsold coal in considerable quantities was marketed at low prices this week. It is said that this coal was shipped into the Chicago market because an embargo had prevented its absorption in eastern territory.

Quotations in the Chicago market are as follows, per net ton f.o.b. car, mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.30@1.45	$1.35@1.50	$1.35@1.45	$1.35@1.50	$1.45@1.50
Steam lump	....	1.25@1.35	1.15@1.25	1.25@1.30	1.20@1.25
2½ and 3-in. lump	....	....	....	....	....
1¼-in. lump	....	....	1.25	1.20@1.25	....
Egg	1.30@1.45	1.25	1.25@1.35	1.35@1.50	1.35@1.50
Nut	....	1.25	....	1.25@1.35	1.25
No. 1 washed	1.40@1.50	....	1.50	....	....
No. 2 washed	1.40	....	1.40	....	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.30@1.35	....	....	....	....
Mine-run	1.25	1.10@1.15	1.05@1.15	1.10@1.15	1.10@1.15
Screenings	.90@1.00	.85@ .90	.85@ .90	.90@ .95	.95@1.00

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.30@1.45	$1.35@1.90	$1.35@1.60	$1.25@1.60	$1.65@1.75
1¼-in. lump	1.25@1.30	1.25@1.35	....	....	1.50@1.60
Egg	1.30@1.45	1.25@1.75	1.35@1.60	1.25@1.60	1.60@1.75
Nut	....	1.10@1.50	1.35@1.45	1.25@1.40	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.25	1.00@1.15	1.15@1.25	1.10@1.25	1.10@1.20
Screenings	.85@ .95	.90	....	....	....

ST. LOUIS

Market quiet. Coarse sizes heavy. Screenings show more activity with better prices.

Quiet prevails throughout the market. Storage piles still supply the bulk of the larger sizes. Buyers for lump, egg and mine-run are hardly to be found whether for steam or domestic grades. No. 1 nut is in fairly good demand. All washed sizes find a ready market. Screenings are showing more activity with better prices than previously. But few mines are operating and these not to exceed half time.

Following is the range of prices, per net ton, f.o.b. cars at mines:

	Williamson and Franklin	Staunton and Mt. Olive	Montgomery Co.	Intermediate	Standard
8-in. lump	.....	.....	.....	$1.15@1.40	$1.00@1.15
6-in. lump	$1.25@1.50	$1.25@1.40	$1.25@1.50	1.15@1.40	1.10@1.15
3-in. lump	1.25@1.50	1.25@1.40	.....	1.15@1.40	.....
2-in. lump	1.20@1.45	1.15@1.25	.....	1.10@1.20	.85@1.00
1¼-in. lump	1.20@1.45	.....	1.15@1.25	1.05@1.15	.85@1.00
6x3-in. egg	1.25@1.50	.....	1.25@1.50	1.15@1.40	1.00@1.15
6x2-in. egg	.....	.....	1.15@1.25	1.10@1.20	.85@1.00
6x1¼-in. egg	1.20@1.45	.....	1.15@1.25	1.05@1.15	.85@1.00
No. 1 nut	1.20@1.50	.....	1.15@1.25	1.05@1.15	.85@1.00
No. 2 nut	1.10@1.40	.90@1.10	.....	.90@1.10	.90@1.10
Mine run	1.05@1.20	1.05@1.15	1.05@1.15	1.00@1.15	.80@1.00
Screenings	.90@1.10	.85@1.00	.85@1.00	.85@1.00	.85@1.00
Washed:					
No. 1 nut	1.50@1.75	1.40@1.50	.....	1.40@1.50	1.40@1.50
No. 2 nut	1.25@1.50	1.25@1.40	.....	1.25@1.40	1.25@1.40
No. 3 nut	1.25@1.50	1.25@1.35	.....	1.25@1.35	1.25@1.35
No. 4 pea	1.20@1.50	1.15@1.25	.....	1.15@1.25	1.15@1.25
No. 4 slack	.90@1.10	.85@1.00	.....	.85@1.00	.85@1.00

INDIANAPOLIS

Mines starting up again. The heavy storing before April has cut down current business. Prices 10c. a ton higher at the mines.

The Indiana miners are working, pending the final settlement of the wage scale and mines are operating wherever there are orders to fill, though these are scarce owing to the stocks accumulated prior to Apr. 1. One company with eight mines has two in operation while next week it will have three or four, and soon after that expects all of them to be going, probably at full capacity. The mines are producing mine-run only, tipples not having been remodeled yet, to comply with the new wage agreement. Screenings are difficult to get as no fresh supplies are being turned out as yet. Screenings, when available command 95c. to $1 a ton, f.o.b. mines for Nos. 5 and 6 and $1.05 for No. 4. The outlook continues good for summer operations of the mines, as the industrial situation is favorable. Retailers have not yet made their usual price reductions to the summer level.

Financial Department

Pittsburgh Coal Co.

This company reports, in substance for the year ended Dec. 31, 1915 as follows:

Results—The total tonnage produced and handled for the year, exclusive of that purchased and handled by the subsidiary companies, was 19,134,436 net tons, an increase over 1914 of 838,585 net tons, or 4.58%. The entire gain shown was made in December.

The gross net earnings from all sources were $4,219,837, an increase over 1914 of $18,767, and the net earnings, after all charges and usual depreciation, were $1,653,524, an increase of $282,465, or 20.60%; the net earnings being 6.124% on the preferred stock now outstanding. This increase was mainly due to decrease in bond interest payments.

Financial—As of Dec. 31, 1915, the undivided earnings account stood in credit the sum of $10,843,514, an increase for the year of $299,934, and the net working capital was $6,596,178, or a decrease for the year of $680,031.

There was paid out during the year $13,120,219, as follows:

Bonds (all companies), car trusts and mortgage debt	$9,006,606
Premiums, bonds retired	841,358
Property	278,797
Plants and equipments	508,742
Bonds and stocks	308,871
Excess insurance losses	822,255
Preferred dividends	1,353,590

Funds to meet the aforesaid came from sinking and reinvestment funds, $8,798,959; exhaustion and depreciation reserves for the year, $1,973,827; working capital, $2,347,433; total, $13,120,219.

The working capital would have shown an increase except for $822,255 of sinkage losses in excess of amounts reserved, chiefly due to a sudden violent weather disturbance which occurred at New Orleans and Natchez on Sept. 29, 1915, when four lives were lost, 336 boats, barges and other craft were wrecked and 244,019 net tons of coal were sunk with but light recovery.

Trade Conditions—The adverse conditions of 1914 continued beyond the first six months, the tonnage for that period showing a decrease of about 15%. Demand gradually increased through the last half of the year and the year ended with a short supply due to improved general demand, stocking of coal against possible mine labor trouble after Apr. 1 and to unsettled rail and seaboard transportation conditions. In nearly every direction both contracted and uncontracted coal during the first ten months of the year was sold at lower prices than at any time since 1912. The aggressive competition of coals from other fields continued to be the chief factor in reducing selling values.

Our product went to Sweden, Italy, Argentina and Brazil, but shipments were limited by lack of vessels and high cost of transportation. It is believed, however, that a permanent foreign market has been secured for it on its quality. Canadian commercial conditions continued to show the disastrous effects of the war on all lines of business but are now improving.

Sales values are much too low in relation to investment cost and risk and it is only through a material advance in prices that a proper return upon the investment can be had.

Mining—Mining operations were carried on in Pennsylvania, Ohio, Kentucky and Illinois. The mining plants worked all or part of year numbered 58, or 68.24%; there were abandoned 7, or 8.23%; available, but idle, 15, or 17.65%, and leased, 5, or 5.88%; total, 85, or 100%. The division of full plant capacity were: Production, 56.26%; shortage of trade, 37.26%; balance, 6.48%, repairs, holidays, car shortage, etc.

Bond Debt—During the year $9,006,606 of bond and mortgage debt has been paid off, including all of the remaining bonds issued under the mortgage of Jan. 1, 1904, and also premiums for retirement of the same in the amount of $841,357. This retirement, which will reduce bond interest charges hereafter approximately $450,000 per annum, was made possible by the sale of property as advised in 1914 annual report.

The direct funded debt of the merged company on Jan. 1, 1916 was $14,235,999, with an average annual interest charge of $772,360. The funded debt of the subsidiary companies was $5,877,000 with an annual interest charge of $396,466, all of which is secured by properties and earnings of such companies. There is no present expectation or apparent need for any further issue of bonds and the proposed reservation fund should effect as rapid a retirement of those now outstanding as both the obligations and the interest of the company will demand.

Temporary Financing—To mine and carry the product until sold and the accounts receivable afterward requires a larger capital than the company now has, or ought to have, for that use, and makes borrowing on cargo bills of lading necessary at times and to a variable extent. Outside of these loans strictly confined to such use, there is no floating debt other than current obligations for operation and maintenance. Our high credit obtains lowest rates and the business to be done for 1916 will, through an expected substantial addition to the working capital, reduce such interest payments.

Merger of Sub. Cos.—A merger of the Pittsburgh Coal Co. of Pennsylvania and of the Monongahela River Consolidated Coal & Coke Co. was effected as of Dec. 24, 1915. All of the stock of the former and practically all of the stock of the latter was owned by this company.

Plan of Readjustment—An equitable adjustment of the preferred stock dividend arrears amounting to 44.58¾%, as of Dec. 31, 1915, has received our earnest consideration. While the undivided earnings from the beginning of operations have been sufficient in amount to pay them, a large portion had to be diverted for purchase of property plant enlargement, stock of the M. R. C. C. & C. Co. and other securities, all necessary for the conservation of the interests of the company, and cash cannot now or soon be withdrawn from the working capital without injury to the company.

It is realized that the annual payment of 6% upon the proposed issue of new preferred stock is a large undertaking, but the plan was not recommended without the support of facts to warrant the belief that the future earning power of the company would be sufficient for its purposes.

Railroad Freight Rates—The efforts to secure from the carriers fair freight rates having failed of any result, protests have been made before the I.-S. C. Commission, etc.

Employees' Association—This association has so far purchased and distributed 4,024 shares of preferred stock and 1,776 shares of common stock among the employees and there are now subscribed and partially paid for 5,453 shares of preferred and 2,431 shares of common stock, or a total of 9,477 shares of preferred and 4,207 shares of common stocks.

Outlook—The outlook is encouraging for both tonnage and prices. For the past 8 years none have been good years throughout. For 1916 there are good grounds for expecting a larger tonnage and materially better prices than for 1915; also a good gain in net earnings.

RESULTS FOR CALENDAR YEARS

(Including Monongahela River Consol. Coal and Coke Co.)

*Production (tons 2,000 lb.)	1915	1914	1913
Pittsburgh district coal	17,590,095	17,348,551	23,451,623
Hocking district coal	840,421	554,312	1,072,873
Illinois district coal	484,218	279,549	.....
Kentucky district coal	219,702	113,439	182,708
Gross receipts	$26,791,985	$25,454,301	$36,266,146
Operating charges, maintenance, repairs, etc.	20,426,372	19,187,127	27,612,608
Taxes accrued	798,299	801,760	751,561
†Interest on bonds, etc., of subsidiary companies	921,521	802,719	957,326
Losses, insurance etc.	425,956	461,624	522,949
Total deductions	$22,572,148	$21,253,230	$29,844,443
Profits, after all expenses	$4,219,837	$4,201,070	$6,421,703
Sinking funds and depletion coal lands	841,318	810,076	1,555,089
Depreciation plant and equipment	1,132,509	1,204,240	1,284,206
Net profits	$2,246,010	$2,186,754	$3,582,408
Interest on bonds	592,486	815,696	856,140
Preferred dividends (5%)	1,353,590	1,353,590	1,353,590
Undivided profits	$299,934	$17,469	$1,372,678
Surplus brought forward	10,543,581	10,526,112	9,153,434
Total surplus Dec. 31	$10,843,515	$10,543,581	$10,526,112

*Production includes sundry purchases from other producers and coal used in manufacture of coke. †Includes commissions, discounts and interest.

Note—For previous annual report of this company see Vol. 7, p. 486.